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Results indicate that the degree of liking among elementary school children (degree of group cohesiveness) has a significant influence on aspects of pupil behavior. In the theoretical framework of reinforcement learning theory, investigation of relationships between cohesiveness (a group variable) and individual behavior can lead both to a better general understanding of group processes and to the achievement of teaching goals by the classroom teacher. A positive relationship was found between learning and cohesiveness for high but not for low IQ student groups. No relationship was found between cohesiveness and task persistance. It was found that the greater the cohesiveness, the more will individuals within the group adhere to common standards. Finally, it was demonstrated, but not unequivocally, that, in a simulated classroom setting, positive attitudes of pupils toward one another are positively related to their receipt of reward within that setting and within one another's presence.

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# INFLUENCE OF CLASSROOM GROUP COHESIVENESS ON LEARNING AND ADHERENCE TO STANDARDS

ALBERT J. LOTT

AND

BERNICE E. LOTT

KENTUCKY RESEARCH FOUNDATION
UNIVERSITY OF KENTUCKY
LEXINGTON, KENTUCKY

# Influence of Classroom Group Cohesiveness on Learning and Adherence to Standards

Cooperative Research Project No. 1700

Albert J. Lott

and

Bernice E. Lott

Kentucky Research Foundation
University of Kentucky
Lexington, Kentucky

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## PROBLEM

Since the education of American youngsters in public schools takes place within a group context, the application of principles of group behavior should facilitate, and make more effective, the achievement of educational goals. One characteristic of groups that has been found to have important consequences for the behavior of individuals within them is the degree of a group's cohesiveness. It is known, for example, that individuals in highly cohesive groups adhere more closely to the group's standards, are more willing to listen to each other, place greater value on the group's goals, and are more accepting of each other's opinions.

The present program of research is concerned with the influence of cohesiveness on two aspects of pupil behavior that are of enduring concern to the educator: the learning of specific academic materials; and the influence that pupils can exert on one another with regard to standards of behavior.

The influence of group cohesiveness on the learning achievements of individuals within the group has received little previous empirical attention. Evidence already exists to support a relationship between group cohesiveness and resultant uniformity of opinion among group members, but the extension of this phenomenon to classroom situations, where it might be applied to induce adoption of positive attitudes toward aspects of the educational process, has not been sufficiently explored.

Finally, in a more general sense, the establishment of systematic relationships between a group variable, like cohesiveness, and significant individual behavior, like learning and conformity, is a prime objective of social psychology. By investigating the present problem in the context of elementary classrooms, the information obtained should not only contribute to a general understanding of group processes but should also be directly applicable to the furtherance of teaching goals by the classroom teacher.

## OBJECTIVES

The overall purpose of the present series of experiments was to test certain derivations from a formululation of cohesiveness in learning theory terms. Briefly summarized, this approach assumes that the primary source of a group's cohesiveness is the attractiveness of the members of the group to one another. The concept of positive attitude is substituted for that of attraction because the former has a precise and particular meaning within reinforcement learning theory (Doob, 1947) and cohesiveness is thus defined as that group property which is inferred from the number and strength of mutual positive attitudes among the members. The primary condition for the development of such attitudes is said to be the receipt of reward, or the achievement of goals, by group members in one another's presence.

Attitudes are conceptualized in learning theory terms as anticipatory responses with cue and drive properties. It follows, therefore, that the drive state (motivation) of persons in the presence of other persons toward whom they have strong positive attitudes will be greater than that of persons in the presence of others toward whom they have relatively weak positive attitudes. Motivation, a hypothetical construct, is measurable indirectly by observing behavior since it is well established that the latter is a positive function of the former, all other things being equal. The behaviors under scrutiny in the present investigation are improved performance following practise (from which learning is inferred), and persistence on a difficult task.

A related objective of the present program is to test the relationship between group cohesiveness and the degree to which group members will manifest uniformity to one another's verbalized standards. The general prediction is that the greater the number and strength of mutual positive attitudes within a group, i.e., the greater the cohesiveness, the more will the individuals within that group adhere to common standards. This prediction stems from the following general assumptions: The greater the cohesiveness of the group, the more have the members experienced past rewards in one another's presence and, thus, the more will members be able to function as secondary rewards for one another, resulting in the maintenance of those behaviors (opinions) which are approved by a majority of the members and the extinction of those behaviors which are disapproved. The specific concern in this investigation is with standards relevant to effective classroom behavior or the pursuit of knowledge in school. It is assumed that a grade school education involves acquiring attitudes toward the learning process itself as well as the mastery of specific content materials. To the extent that these attitudes are mediated by a group, the above-stated relationship with group cohesiveness should operate.

An important consideration in the predicted cohesiveness-uniformity relationship is whether or not the relationship can be expected to be equally strong under all conditions tested. It is the position here that this relationship will vary in degree from high to low as the topic under consideration or at issue among the group members varies from high to low in its similarity to the activities that are typically engaged in by the group members in one another's presence. In more theoretical terms, it is expected that uniformity should result where the stimulus features are similar, to some degree, to those which were present when group members acquired their secondary reinforcing characteristics. The principle of stimulus generalization should be employed to predict the effectiveness with which group members can act as secondary reinforcers for one another in diverse situations.

The third major objective of the present research was to demonstrate that, in a simulated classroom setting, positive attitudes of pupils toward one another, the lesson studied, and the teacher, are positively related to the frequency with which they obtain rewards. Reward is defined as any measurable (observable) manifestation of approval directed toward a pupil by the teacher. The investigators have already shown (Lott and Lott, 1960; James and Lott, in press) that when one individual is rewarded in the presence of another he will subsequently manifest a positive attitude toward that other person. The intent here was to verify this phenomenon in a context that more nearly approximated a classroom setting, thus extending its generality and increasing its potential for application.

## RELATED RESEARCH AND THEORY

We are concerned, here, with research and theory relevant to the concept of cohesiveness. Our starting point in reviewing and categorizing the literature is the definition of cohesiveness as "that group property which is inferred from the number and strength of mutual positive attitudes among the members of a group" (Lott, 1961). The adequacy of this definition may be questioned and some may claim that it merely focuses on one of several components of cohesiveness. There will certainly, however, be little disagreement that interpersonal attraction, liking, or positive attitudes among group members, is central to any theoretical consideration of cohesiveness, whether other factors are also viewed as independently relevant or not. In other words, defining cohesiveness in the terms we have chosen is only relatively arbitrary. Tagiuri (1958), for example, has noted that, "Factor analytic studies of mutual ratings by members of small groups, concur on the presence of three basic factors: influence and initiative, task competence, and like-dislike. While the first two are not applicable to every group, the last one is always present", and "other things being equal . . ., the category of like and dislike 'packages' most of the determinants of interaction." In a more general vein, we may cite Bonner (1959, p. 66): "If we analyze group cohesiveness . . . in terms of a group's attractiveness for its members, we are confronted by the obvious fact that without at least a minimal attraction of members to each other a group cannot exist at all."

While most researchers in the area have subscribed to the position introduced by Festinger and his coworkers (1950) that the cohesiveness of a group, i.e., the desire of individuals to maintain their membership in a group, is contributed to by a number of independent forces, many investigations have focused on one force, intermember attraction. When investigators have desired to manipulate the cohesiveness of groups, regardless of their nominal definition of the concept, the operations performed have typically involved telling the members of some groups that they would probably like each other, be congenial, etc., while telling others just the opposite. Further, in measuring the cohesiveness of experimental or naturally existing groups, some sociometric device is generally utilized to determine how much each member likes or is attracted to the other members. For the most part the other forces which are assumed to determine, or be reflected by, the cohesiveness of a group have received less attention although some investigators have manipulated variables other than interpersonal attraction in varying group cohesiveness and some have measured it along different dimensions. In the present discussion, however, we shall be concerned only with studies of interpersonal attraction among group members and its relation to other group process variables. How do co- or interacting persons get to like one another? And, once they do, to some measurable degree, what are the consequences of this state of affairs for the group, or for the behavior of the members? We want to take stock of the answers which existing research has already given to these questions. We want, then, to compare empirically based generalizations with theoretical statements, i.e., with predictions which have been, or can be, made from some of the more systematic formulations of group behavior.

Considered in this review are investigations of real or simulated interaction among persons who are in association with one another on a relatively voluntary basis. Omitted are studies of special populations like prisoners or psychotics. Another limitation is provided by date of publication; our interest is in the recent research literature and the majority of the investigations considered here have been reported between 1950 and 1962. Other reviews have provided adequate coverage of the earlier literature (e.g., Roseborough, 1953; Cartwright and Zander, 1953 and 1960; Kelley and Thibaut, 1954; Lindzey and Borgatta, 1954; Riecken and Homans, 1954; van Bergen and Koekebakker, 1959). We have also, for the most part, omitted unpublished studies and technical reports. Inevitably we will have by-passed investigations which some consider of utmost relevance despite our attempt at thoroughness within the limitations mentioned above. We can only hope that such inadvertent omissions will not seriously affect the value of our critique.

What is our purpose in preparing this review? The number of relevant and near-relevant papers is staggering, but while a small number of phenomena or relationships have been demonstrated over and over again, other relationships remain as hints, unexplored, or equivocal. We can hopefully document both the former and latter, helping researchers to move away from the known in the direction of either more refined investigations of clear relationships or concentration on those which have not certainly been established.

To this end we intend to be as simple-minded as possible and to focus on findings which are manifest and relatively unambiguous. We cannot here deal seriously with problems of methodology and measurement. Our major question is, what has been shown to hold over a variety of situations, using various techniques to manipulate conditions, and innumerable devices to infer changes in dependent variables?

## Antecedents of Liking: Empirical Generalizations

The research considered here will be discussed under categories linking specific variables to the consequent attraction of one individual, A, to another, B. Within each category may be found a number of different types of investigation which can be roughly classified as follows:

1. Experimental manipulation of variable X (or variables X, Y, etc.) with consequent direct measurement of the dependent variable, liking, or some other dependent variable which is assumed to reflect interpersonal liking, e.g., attraction

to the "group". In some cases this assumption will have been made by the original investigator; in others by the present writers.

2. Natural groups which are known to differ in the degree of interpersonal liking existing among the members are compared on other variables to determine relationships with liking. In some cases it is reasonable to assume that these other variables antedate interpersonal feelings within the groups studied while in other cases the question of "which came first" cannot be satisfactorily answered.

We are primarily concerned with liking as measured by direct choice of A for B, or as measured by A's rating of B on a scale, where the criterion for choice or rating is of a general social nature as opposed to one of a specific work or task-oriented nature. Studies concerned with the latter have been considered if they were viewed as having relevance to more general attraction.

Interaction - propinquity.

A will like B if A interacts with B. Bovard has shown (1951b, 1956a, 1956b) that positive affect toward individual group members and toward the group as a whole will increase significantly more in group-centered classes where verbal interaction is encouraged than in leader-centered classes, and that the relationship between average interaction within groups and average affect ratings of individual members is approximately linear. McKeachie (1954), too, found that students in group-centered classes differed reliably from students in leader-centered classes in the direction of greater liking for their group. Propinquity in boarding school classes was reported to be very reliably linked with liking choices by Maissonneuve, Palmade, and Fourment (1952). Similarly, in college classes, seat neighbors were found to become acquainted with one another significantly more often than non-neighbors (Byrne and Buehler, 1955) and the intensity of the relationship formed (i.e., whether best friend, friend, or acquaintance) has been reported to be greater among the former than the latter (Byrne, 1961b).

Studies of other natural or semi-natural settings, outside of the college classroom, have also yielded evidence in support of the relationship between opportunity for interaction and attraction. Gullahorn (1952) observed and interviewed clerical workers in an office of a large corporation. He found that distance was the single most important factor determining rate of interaction between any two employees and that there was a tendency for persons who interacted frequently to develop "sentiments of friendship". In a housing project for married veteran university students, the two major factors affecting friendship were found to be sheer distance between houses and the direction in which the houses faced (Festinger, 1953); in another study, sorority girls living together chose best friends among themselves (house residents) significantly more often than they chose sorority sisters who lived outside of the "house" in town (Willerman and Swanson, 1952); and the sociometric preferences of bomber crew members were shown to be reliably predictable from a knowledge of their location and function on the plane, i.e., from a knowledge of who they had the greatest opportunities to interact with (Kipnis, 1957). In a summer camp, Sherif and Sherif (1953) divided boys into two groups by breaking up budding friendships. As boys in each of the new groups worked and played together, friendship choices were reversed or shifted away from the boys preferred earlier toward boys within the new group. A subsequent study (Sherif, White, and Harvey, 1955) duplicated these results. Similarly, Heber and Heber (1957) have reported that elementary school children increase their favorable ratings of each other on a social distance scale following common small group experience, and Zander and Havelin (1960) found that among three-man groups of initial strangers in the Norwegian Navy, men preferred to remain in their own groups following a period of interaction. Both of the last mentioned investigations also demonstrated that the interaction-attraction relationship is subject to variation in degree as a function of conditions such as success or failure and task competence of group members.

Even in a competitive situation individuals, following interaction, have been found to become more favorable in their ratings of the traits of both their own teammates and their opponents (Wilson and Miller, 1961), although the increase in favorableness for teammates and opponents is not the same under all conditions. Finally, the reduction of prejudice by white persons toward Negroes has been reported to covary with increased contact between persons of different color in situations as diverse as a meat packing plant (Palmore, 1955), a housing project (Deutsch and Collins, 1958), and a university classroom (J. H. Mann, 1959).

That sheer contact may be a necessary but not sufficient condition for attraction has been shown by other investigators. Festinger (1953), for example, has discussed a housing project in which few group memberships and little social life existed among residents. Here residents, who felt "forced" to live in the project by circumstances beyond their control (housing shortage), were largely negative in their attitude toward their community and neighbors. Gundlach (1956) found among a sample of white women workers who were members of left-wing unions with strong fair employment practises, persons in one subgroup with high education and high social aims, who were in contact with Negroes of similar education and aims, to be most hostile and derogatory toward Negroes. This subgroup was also most anti-union. The other white union members, on the other hand, exhibited far less prejudice than that reported for samples of the general population.

In two controlled studies, Stotland, Cottrell and Laing (1960), and Stotland and Cottrell (1962) found no significant relationship between interaction and desire to get to know one's fellow group members. The interaction in these investigations conveyed no information about members' characteristics, was nonverbal, and only faces or heads of members were visible. This was not the case, however, in another investigation (of sorority girls residing in the same house) where only a slight correlation was obtained between ranks on a liking scale and frequency of interaction (Backman and Secord, 1962).

It seems likely, from the evidence available, that interaction, to produce attraction, should take place in a relatively neutral atmosphere and should include communication or observation of behavior. Theoretical statements, with which we will be concerned later in this paper, have suggested why this should be the case.

Special characteristics of the group situation or "atmosphere": cooperation; democracy; free expression; clarity of goal.

A will like B if both have worked together for common rather than for mutually exclusive or individual ends. Stendler, Damrin, and Haines (1951) observed groups of second grade children working for individual reward and for group reward. Only under the latter condition did positive interactions exceed negative ones. Groups of fourth grade children were studied by Phillips and D'Amico (1956). In one condition rewards were distributed according to individual contributions while in another rewards were shared equally. Attraction to members of one's group, measured sociometrically, increased in more groups of the latter kind than in those of the former. Further, in those competitive groups where rewards were distributed fairly evenly because members were well matched, the level of intermember attraction either remained as it was or increased. Increased liking, acceptance, or friendliness among subjects who have cooperated on a task, in contrast to those who have competed, has also been reported by Gottheil (1955) working with eighth grade students, by J. R. P. French (1951) who studied adults attending a laboratory for training in group relations, and by Deutsch (1960) who varied the conditions under which reward was attained within college classroom groups.

In a recent study by Solomon (1960) pairs of subjects played a game while each partner was in a separate cubicle, unable to see the other, and communicated via electric switches. In such a situation, too, subjects who received a cooperative strategy from their partners (i.e., one promoting maximum mutual gain) tended to develop greater liking for them than did subjects who received a non-cooperative strategy.

Negative findings have been reported by Rosenbaum (1959) who had pairs of male undergraduates discuss together for twenty minutes their choice of an ideal college. At the end, cooperating pairs (defined in terms of both members being eligible for reward as opposed to just one) differed significantly from competing pairs on a measure of assumed similarity of personality traits but not on a social distance scale of desired relationship with partner. These findings contradict most of the others reported but it is not clear what the responsible conditions might be. In a study by Myers (1962) members of competitive rifle teams were found to increase their esteem ratings of their teammates more than members of noncompetitive teams but in this case the individual members of competitive teams were not working against each other but were working together against other teams. In the main, therefore, the empirical generalization regarding cooperative endeavour and attraction is found to be supported.

A will like B if both are in a common situation in which democratic participation is encouraged. Evidence for this generalization is found in the classic experiment on social climates conducted by Lewin and his coworkers in 1939. White and Lippitt (1960) have reported that, in general, when the boys' groups were supervised by a "democratic" leader, there was more friendliness among the boys than when they were supervised by an "autocratic" or "laissez-faire" leader. There was, further, greater group-mindedness, more mutual praise, and more spontaneous subgroups of five and four-one, representing the greatest possible unity in a five-person group. No sociometric data were obtained in either of the two experiments comprising the investigation and judgments of friendliness are based primarily on analysis of conversations. It is regrettable, then, that so few other studies have been designed to specifically test the hypothesis that between similar groups differing only in leadership style, members of democratic groups will like each other more than will members of autocratic ones.

Inconclusive data bearing on this proposition were obtained by Rehage (1951) in a study of eighth grade social studies classes. In one class, planning was done by pupils and the teacher, while in the other by the teacher alone. Students in the two classes had been matched on IQ score and an acceptance-rejection index. At the end of a year there was no difference between the two classes in acceptance-rejection indexes of pupils but there was a difference in general group structure: well defined sub-groups present at the beginning tended to persist in the traditional class whereas friendship patterns had been "modified perceptibly" in the other.

Berkowitz (1953) has also reported relevant data from an investigation involving observation of seventy-two actual conference groups in government and industry and the testing and interviewing of individual participants. Leader permissiveness in discussion content was found to correlate positively with an index of group cohesiveness (which included a measure of personal liking among members) especially in groups characterized as having "urgent problems" to solve. Further analyses indicated, however, that in groups which were permissive with respect to content the cohesiveness index correlated positively with leader control of group process and with functional differentiation of leader's role, and negatively with percent of participation and problem solution by members. Individuals in the groups studied by Berkowitz shared, apparently, "an expectation . . . that the designated leader, the chairman, is to be the major behavioral leader in the group," and the more this was true, the more satisfied were the members with their conference.

A will like B if both are in a common situation in which they feel free to manifest attitudes which they ordinarily are restrained from expressing. We have found one study in which this proposition was tested (Festinger, Pepitone, and Newcomb, 1952). Male undergraduates discussed personal feelings toward their parents and were subsequently questioned, on a five-point scale, regarding attraction to their discussion groups. A positive but nonsignificant correlation was obtained between attraction to the group and the frequency with which negative attitudes had been expressed.

A will like B if both are in a common situation in which the group's goal and the path to this goal are unambiguous. Raven and Rietsma (1957) have reported a study by Cohen of telephone operators in which it was found that those given inconsistent cues and ambiguous solutions to problems were less secure, less motivated and less efficient than others. In an attempt to extend these findings, Raven and Rietsma predicted that the greater the clarity of the situation, the more favorable would individuals be in evaluating their group. Responses to a seven-point scale regarding feelings about other group members (who were simply heard over a loudspeaker), administered once during the task and again at the end, were in the predicted direction but not statistically significant.

With the exception of cooperation among group members the other situational variables considered in this section have not been shown to have an unequivocal, reliable relationship with intermember attraction. Substantiation or refinement of the generalizations awaits additional research.

Acceptance by others.

A will like B if B likes or "accepts" A. A number of studies reporting data in support of this hypothesis have followed the general procedure of manipulating conditions so that A believes himself to be liked (or not liked) or accepted to some degree by B, and A's attraction toward B is subsequently measured. In an investigation by Backman and Secord (1959), for example, subjects were given the names of others who would most probably like them (as judged by the experimenter's evaluation of personality test data). At the first interaction session the number of these "probable likers" chosen as desired "team partners" was significantly above chance. At subsequent interaction sessions (during which the subjects got to know one another) this initial effect disappeared. In variations of this procedure, Kelley and Shapiro (1954) and Dittes and Kelley (1956) found that subjects made aware of positive ratings of themselves presumably made by their fellow group members, differed significantly from others made aware of negative ratings, in their desire to remain in the group or to work with the other members. The dependent measure used in the earlier study included ratings of individual co-workers. Similarly, Dittes (1959a), who permitted subjects to see fictitious ratings of themselves by others, found that the more accepted members were significantly more attracted to the group qua group and that this was more true of persons with low as opposed to high self-esteem.

In a study of the consequences of rejection, Pepitone and Wilpizeski (1960) demonstrated that in the no rejection condition, where the subject believed himself to be significantly more liked by his group members (two confederates) then in the rejection condition, he also tended to like his fellow members reliably more. Pepinsky, Hemphill, and Shevitz (1958) manipulated rejection and acceptance by having stooges react negatively or positively to attempts at leadership by subjects. Under the first condition, the confederates received a disproportionate share of negative sociometric choices while under the second, favorable choices were randomly distributed between confederates and other subjects, and the groups were significantly higher in "morale". Harvey (1962) has shown a relationship between subjects' reevaluations of friends and strangers and the ratings presumably received from the friends and strangers: "agreement or near agreement of the source's with subject's self-ratings resulted in subject becoming more positive toward the source, particularly the stranger source . . ." Also concerned with rejection, Snoek (1962) compared its effects when of an invidious and non-invidious nature, the latter being impersonal and not implying negative evaluation of the rejected person. Subjects exposed to the latter condition showed a greater reduction in attraction to the group as measured by the question, "do you want to remain a member?", but the reason for rejection did not make a difference on a measure of rejected subjects' desires for contact with individual members. The reasons for rejection differed not only on the invidious-non-invidious dimension but also in terms of a subject's expectation that he might join the group (bridge club). When the rejection was invidious it was based on personal qualities and skill (open to change) but when non-invidious it was based on the subject's sex, i.e., the other group members preferred to have a girl. Utilizing a procedure designed to induce not rejection, but simply a "fear of rejection" in some groups and not in others, De Charms (1957) found a tendency (nonsignificant) for subjects in the former to find their groups less attractive, as inferred from responses to a questionnaire.

Some studies have manipulated acceptance by varying status within the group. In a role-playing situation Zander and Cohen (1955) found that subjects playing high status persons were significantly more attracted to their groups than those playing low status persons, and the former also differed from the latter in having perceived themselves as making a good first impression and having influenced the group. Berkowitz and Macauley (1961) reported that subjects who believed themselves to have been elected by other group members as discussion leaders tended to be more highly attracted to their fellow members both as social companions and work partners if they also believed that their high status could drop.

In a questionnaire study of staff members in a child welfare agency, Jackson (1959b) obtained some evidence that professional personnel selected by co-workers as being the "most valuable" in terms of their contributions tended to be more attracted to their groups and its members, especially if they were in high contact with one another. Also utilizing a natural environment, Newcomb (1956) studied seventeen men, initially strangers, housed together in a dormitory. Throughout the period of interaction there was a positive relationship between liking of others and believing oneself to be liked by them. Similar findings were reported earlier by French (1951) and Tagiuri (1952). French found that among the bases on which friendship choices were made among group members was the extent of actual and expected reciprocation of choice, and Tagiuri, after investigating about thirty different groups, reported that the "relationship between perception of affect and affective response has been found to obtain generally, irrespective of the size of the group, the sex and the age of the subjects . . ." Whether A's perception that he is positively evaluated by B andedates his liking of B is not clear from these particular studies but the controlled experiments which have been cited amply support the empirical generalization with which this section is concerned. That, as we shall see later, one of the consequents of A liking B seems to be a tendency for A to perceive himself as also being liked by B, lends additional significance to the importance of mutuality or reciprocation.

Frustration-threat

A will like B if both are in mutual danger or subject to stress by an outside source. Sherif and Sherif (1953) reported that the consequence of frustrating and competitive intergroup relations for boys at a summer camp was to solidify "in-group belongingness and solidarity . . . and to strengthen in-group friendships." Earlier Wright (1943) had observed the same general phenomenon. Pairs of children were subjected to frustration by the experimenter with a consequent increase in cooperative behavior and a decrease in time spent in conflict. No direct measure was obtained of friendship or liking. In another early study, the well known "social climate" investigation by Lewin and his co-workers, the autocratically led, submissive, groups were found to surpass all others in the proportion of friendly remarks among the boys (White and Lippitt, 1960). Two other studies in which no direct data on intermember liking are reported are also relevant. Lanzetta, Haefner, Langham, and Axelrod (1954) and Lanzetta (1955) found that groups of reserve officer trainees working, in one study, under the threat of "evaluation" and, in the other, under the stress of time and negative comments by the experimenter, were more sociable, cooperative, and friendly than groups working on identical tasks but under no threat. More recently, Myers (1962) reported that individuals in three-man teams facing "adversity", i.e., competition against other teams, pulled together and rated one another higher than did individuals in non-competitive teams. Despite the fact that an absent member reduced his team's score on the day of his absence, these individuals, too, were rated higher by members of competing groups; the latter also perceived themselves as being more accepted by their teammates than did members of noncompeting teams.

The findings of some investigators indicate that the shared threat-attraction relationship is influenced by other variables. Hamblin (1958), for example, demonstrated that group integration does not increase under threat or crisis when a likely solution requiring cooperation is unavailable to the group members. Some groups were subjected to arbitrary rule changes while playing a game; others were not. The former groups were observed to differ significantly from the latter in the following areas of behavior exhibited post-"crisis": less helpfulness among members, less praise of others, and greater antagonism. No data were obtained, unfortunately, on groups subjected to threat where a likely solution was available. Data reported by Mann and Mann (1959) may be interpreted as supporting Hamblin's hypothesis. Classroom groups, meeting four times a week for one hour over a three-week period, were organized as task-oriented study groups to discuss assigned lists of reading or as free discussion groups. Ratings of the members' desirability as friends increased in the former groups and decreased in the latter where, according to observers, the subjects were frustrated and angered by the indefiniteness of their situation. As in Hamblin's study, perhaps, these subjects saw "no way out".

That the threat shared by individuals should be one emanating from an external source in order for increased liking of one another to follow is suggested by the findings of Pepitone and Kleiner (1957). High status groups of boys at a summer camp (i.e., winners of two out of three tournament games) were told either that they would probably lose the tournament (threat) or that they would probably win. Following the threatened loss of status there was no change in the number of positive choices made among teammates while among those told they would probably win there was an increase in positive choices. In this study threat was operationalized by a prediction of failure made by a source external to the group but failure would necessarily result from poor playing on the part of the boys themselves.

It is apparent from the studies cited that definition or manipulation of "threat" varies from one investigation to the next. It has, for example, been equated with intergroup competition, with frustration or negative treatment, and with threat of failure. In other research (e.g., Burnstein and McRae, 1962) poor evaluation of group performance on a task has been used to induce a condition of "shared threat". Such studies, in which actual success or failure constitutes the major independent variable, will be discussed separately in a subsequent section. Despite differences in the operations used to create a stressful situation, the evidence examined here suggests that attraction among individuals will increase when their common threat stems from an external source, i.e., is not a function of their own lack of skill, and when there exists the possibility that cooperative behavior may reduce or eliminate it.

Status

A will like B if both are members of the same high status group or if both occupy high positions in a mixed status group. Supporting this generalization is a well known study by Thibaut (1950). The status of teams of boys was manipulated by the role of each team in a series of games, and the boys subsequently chose teammates for a further game. Those in high status groups (especially peripheral or less popular boys) showed a significant increase in proportion of own-team choices. Popular or central members of low status groups which had been unsuccessful in an attempt to improve their status also increased their proportion of own-team choices. We shall consider this latter finding again in our discussion of the effects of the success-failure variable on interpersonal attraction. Our concern here is with the consequences of status defined by operations other than success or failure on a task. Further evidence appears in a report by Festinger (1953) in which he compared a housing project for married veteran students (Westgate) with a government project outside of a large city (Regent Hill). The inhabitants of the two projects are described as differing sharply in the evaluation of the prestige and desirability of their respective communities. The majority of those living in Regent Hill resented having to be there (because of the post-war housing shortage), and thought of their neighbors as lower class. The students of Westgate, on the other hand, were living among pre-professional peers and had a generally positive attitude toward their community. It is not surprising, then, that many more informal and formal groups were established, and friendships developed, among neighbors in Westgate than in Regent Hill. In another field study, of industrial work groups, Seashore (1954) found a small but significant positive correlation between perceived status of one's job and an index of group cohesiveness (which did not include a measure of intermember liking). Since perceived status of job was determined by asking individuals whether they had a "good" job, it is not clear, however, whether the obtained findings reflect a relationship between cohesiveness and job prestige or between cohesiveness and job satisfaction.

Other relevant research has been done on groups composed of members differing from one another in status. Individuals high in professional prestige, attending a one day conference, were found to prefer others like themselves for friendly interaction over individuals of lower status (Hurwitz, Zander, and Hymovitch, 1960). In a laboratory situation where status was manipulated by the desirability of job performed, subjects in high status but mobile positions tended to accept persons at their own level and reject others (Kelley, 1951), although there were no significant differences between conditions in choice of best-liked person. Cohen (1958) has reported similar findings to Kelley's regarding high status subjects. Jennings, too, (1950) found that mutual choice was greatest among the over-chosen or high status girls (the leaders) on a "live and work with" criterion question. Mutual rejection was also greatest among these girls, suggesting the operation of competition or rivalry (Homans, 1961) under the same conditions which produce attraction.

A will like B if B's status is higher than A's. That the tendency for high status persons to be attracted to others of high status is probably independent of a similarity-attraction relationship is suggested by findings which support this second generalization. Hurwitz, Zander, and Hymovitch (1960), for example, found that individuals low in professional status liked those of higher status more than they liked each other. Data on direction of communication support the sociometric findings. Masling, Greer, and Gilmore (1955), working with military men, also found status to be highly related to sociometric ratings, and Tagiuri, Kogan, and Long (1959) reported that college preparatory students tended to choose (for a roommate), without perceiving themselves chosen in return, individuals with high choice status, while they perceived themselves as being chosen by individuals of lower status. In the previously mentioned Kelley study (1951) the low task status but potentially mobile subjects exhibited friendly behavior to high status subjects, as judged from an analysis of written messages; this was not true, however, of low status non-mobile individuals. Cohen's replication of this study (1958) obtained similar data and, in addition, found that non-mobile low status subjects sent significantly more cohesiveness enhancing comments to their own subgroup than did mobile low status subjects. The non-mobile low status subjects may have experienced a conditon of common frustration which, perhaps, was a more powerful variable than status in influencing the development of positive affect toward other group members. Findings from another study (Thibaut and Riecken, 1955) suggest that some people may be more prone than others to be influenced by relative status in their acceptance or rejection of persons. Men high in authoritarianism, after experiencing aggression at the hands of an instigator, rejected him less if his status was high and rejected him more if his status was low than did less authoritarian men.

A number of investigations have found that individuals tend to like persons who have influenced them, and it seems reasonable to include such findings in the present discussion since the direction of influence is most usually from a position of high to a position of lower status. Whether influence precedes attraction, or vice versa, is, however, not clear, since the data have come from studies in which influence has not been manipulated. Perlmutter (1954), for example, has reported that within adult discussion groups, the greater the perceived influence of a member, the more desirable were the traits assigned to him; in some groups a significant positive correlation was also obtained between the valence of a group member with respect to "most prefer working with" and his perceived influence. Earlier, Lippitt, Polansky, and Rosen (1952), in a replication of an earlier study, found that boys in a summer campt situation tended to like those boys to whom they also attributed high power (or influence potential). Tagiuri and Kogan (1960) have reported positive correlations between liking of others and feeling influenced by them, as well as between liking of others and feeling influential over them. The latter finding, together with evidence from Kelley (1951), suggests another phenomenon toward which additional research might well be directed. Kelley found that high status non-mobile subjects, i.e., those not threatened by loss of status, exhibited as much inter-level friendliness as did subjects in the non-hierarchic control condition.

A will like B if both occupy positions within their group which are congruent with their status in other groups. Adams (1953) found that in bomber crews where members were in the same status relationship to one another on a number of different dimensions, e.g., age, education, role prestige (where, in other words, status congruency was high), there were more friendships than in crews where status congruency was low. Similarly, in a study of supermarkets by Clark (cf. Homans, 1961), congeniality between "ringer" and "bundler" was found to vary with status congruence: congeniality was high when the ringer was equal to, or higher than, the bundler in both general work responsibilities and social position. Exline and Ziller (1959) set up congruent and non-congruent decision-making groups in terms of status derived from each member's ability on a task and the worth of each member's vote. Congruent groups were rated by observers as significantly more congenial. An investigation by Raven and French (1958) is also relevant. They predicted that the more a supervisor was perceived as having a legitimate right to her position, the higher would be the ratings she received from group members on a liking scale. The results, although not statistically reliable, were in the predicted direction. Judging status along a standard of legitimacy may be considered of the same nature as comparing status on one dimension with that on another.

Behavior or personality characteristics.

A will like B as a function of B's behavior or personality characteristics, observed or known by A. Here we will consider investigations which have related the attractiveness of an individual to his specific characteristics, regardless of those of the individual attracted to him or the nature of their relationship.

One class of such studies is represented by those in which persons differentiated on the basis of personality test scores are compared with respect to their likability or the extent to which they are chosen by others as friends (or on some related criterion). Masling, Greer, and Gilmore (1955), in two separate investigations with army men, tested the hypothesis that "equalitarians" will receive more sociometric nominations than "authoritarians" because they exhibit greater warmth and less hostility. This assumption was based on previous research by Sanford and by Eager and Smith in which equalitarians were found to be perceived as warmer than authoritarians, and camp counselors judged as hostile scored higher on a measure of authoritarianism than those not so judged (cf. Masling, et al, 1955). Masling and his co-workers found that a small but significant positive relationship between equalitarianism and sociometric choice did exist where army status was held constant. Chapman and Campbell (1957) have also reported a small, insignificant correlation in the same direction: high F individuals tended not to be chosen as desirable teammates. In a different kind of study, Kates (1959) had subjects rate two stimulus persons described in case studies. The objectively more authoritarian person was perceived by the subjects as having greater power, exhibiting more leadership and being more personally attractive. He was not, however, judged as being more authoritarian. These findings, then, do not contradict those cited above since the difference in authoritarianism between the two stimulus persons was not recognized by the subjects.

A number of investigators have pursued the question of whether individuals with relatively positive self-concepts are more attractive or better liked than persons with less positive self-concepts. McIntyre (1952) found no significant difference in responses to a self-attitudes questionnaire devised by Phillips, between the most highly and the least accepted men within a college sample. A similar study by Fey (1955), using his own self-attitudes scale, also obtained no significant relationship between self-acceptance and acceptance by others, but subjects with high self-acceptance and low acceptance of others tended to be rejected by others. Positive findings with respect to self-acceptance and acceptance by others have been reported by Miyamoto and Dornbusch (1956) as well as by Reese (1961). In the latter study, of elementary school children, evidence was obtained for a curvilinear relationship, i.e., high acceptance, measured by both rating and ranking, was found to be accompanied by moderate self-concept scores as measured by a scale devised by Lipsett.

Still other characteristics have been found to distinguish attractive, likable individuals. Kelley (1950) had students in an economics class rate a substitute teacher, about whom they had previously received information, on seven personality-behavior scales, following a discussion led by the substitute. Those students to whom the substitute had been previously described as "warm" consistently rated him more favorably than those to whom he had been described as "cold." Using multiple criteria to determine acceptance and rejection among dormitory members at a girls' college, Lemann and Solomon (1952) found that highly accepted girls were rated by their peers as "generous, enthusiastic, and affectionate, while girls with low status were generally rated more stingy, apathetic, and cold." R. L. French (1951) obtained data among naval recruits which indicated that men with sick bay and disciplinary offense records tended to be less acceptable to their peers than were other men; and Tagiuri (1952), in comparing fifteen maladjusted prep school boys (i.e., boys who had been seen by the school psychiatrist) with fifteen well-adjusted boys, found that the latter received more positive sociometric choices from their peers than did the former. A similar phenomenon in a quite different environment has been reported by Speroff and Kerr (1952): among a group of workers in a steel mill interpersonal desirability was negatively correlated with number of personal accidents.

With the exception of the Kelley (1950) study, the other investigations mentioned in the preceding paragraph leave unanswered the question of which variable, positive behavior or relative attractiveness, is antecedent and which is consequent. This is true, as well, of a study by Van Zelst (1951) in which construction workers who were rated high in desirability by others were found to differ significantly from those rated low in being generally better adjusted to their jobs and more favorable in their attitudes toward the company. Causality is more apparent in findings reported by Kipnis (1961). Male freshmen who had ascribed negative traits to their best friends (more than to themselves) broke off these friendships, within a six-week period, more frequently than did those who had ascribed more positive traits to their friends than to themselves.

Pepitone, in a study with Sherberg (1957), found that subjects who read scripts of an incident involving a punishing person rated him significantly higher on a liking scale, i.e., disliked him less, when he was perceived as having "good intentions" than when his intentions were believed to be bad. In another study with Wallace (cf. Pepitone, 1958), subjects who failed test items under arbitrary conditions imposed by the experimenter, disliked him more than did subjects who failed justifiably. In both of these studies, an individual's attractiveness to others is seen to be influenced by his particular behavior in a given situation regardless of whether this behavior is characteristic of his personality.

That both more enduring traits and situation-specific behavior determine attractiveness is suggested by the findings of Jennings' (1950) investigation of interpersonal relations among four hundred girls in a training school for delinquents. Girls who were over-chosen by their peers on the criterion of "live and work with" are described by Jennings as sensitive "to the elements of the total group situation to a very much greater extent than the average member"; they contributed constructively to the development and positive experience of others, displayed high esprit de corps and tended to internalize private worries. Compared with the other girls, the highly chosen were less quarrelsome, less aggressive, more cooperative and initiative-taking. Similar findings have been reported by other investigators. For example, with respect to the variable of sensitivity, Gage and Suci (1951) found that high school teachers who were more accurate in predicting their students' opinions on school related matters were also those who elicited positive affect from their students. Popularity has been related to accuracy in the perception of others' interpersonal preferences within infantry rifle squads (Greer, Galanter, and Nordlie, 1954) and to accuracy in the perception of others' popularity and group dimensions within classroom groups (Bugental and Lehner, 1958). Other characteristics of liked persons, similar to those reported by Jennings, are also supported by subsequent investigations. Haythorn (1953) found, among naval reserve officer trainees, that those men who were most often chosen by their peers on a number of sociometric criteria were those who most facilitated the effective functioning of their groups, who were rated cooperative, efficient, and insightful, and who scored high on personality measures of maturity, adaptability and acceptance of others. Positive relationships have also been reported between likability and number of interactions initiated in discussion (Norfleet, 1948), judged value of contributions to the group (Theodorson, 1957), and frequency of participation (Shelley, 1960a).

In the Theodorson study (1957) the cited relationship was limited to certain groups, those high on an index of cohesiveness. Other limiting conditions are suggested by an investigation by Bales (cf. Riecken and Homans, 1954). Individuals in problem solving groups rank-ordered each other on four criteria at the end of each of several meetings. Scores on "contributed best ideas to solve problem" and "did most to guide discussion" correlated highly with frequency of both initiation and receipt of interaction but "like" scores correlated highly with the other scores only at the first meeting, and not at subsequent ones. A man who had ranked high at the end of the first meeting on both the "best ideas" and the "like" scales tended to keep the latter status and lose the former by the end of the second meeting. Thus, in certain kinds of groups, specification of which is still unclear, "task master" and "good fellow" roles (Riecken and Homans, 1954) may be antithetical. In another investigation, Bales found that group members tended to dislike those leaders who talked more than they were talked to while leaders "whose ratio of receipts to initiations was high were apt to be chosen highly for both guidance and liking" (cf. Homans, 1961, p. 306). Related to this general question, Jennings noted (1950, p. 272) that although many of the choices made on the "live or work with" criterion were the same as those made for leisure-time companions, there were also differences and the foundations for the latter choices seemed to be "based more exclusively in warmth and good feeling, as ends in themselves."

A large number of investigations concerned with individual personality and small group performance, reported between 1900 and 1957, have been reviewed by R. D. Mann (1959). He concluded that the data on "popularity" support a positive relationship with "extroversion, intelligence, adjustment, and conservatism."

It is apparent that the attractiveness of an individual is enhanced by certain behavior which may be either temporary and situation-bound or enduring and central to his personality. This behavior, as seen from the research summarized above, can be described in terms of warmth, equalitarianism, good adjustment, sensitivity, helpfulness, and so on. Such behavior might be further described, more generally, as that which should result in interaction that would have pleasant as opposed to unpleasant consequences.

Similarity.

No other variable considered thus far has been the object of more investigation than this one. One of the major problems, however, as we shall see, is that the question of whether mutual attraction is a consequent or an antecedent of similarity is not always answered, although there have been a few controlled studies directed specifically at clarifying the direction of the relationship. A related problem in this area of research concerns the measurement of similarity. B's similarity to A is sometimes objectively determined; other times A simply perceives B as similar to himself (and perhaps erroneously). In the latter case, does A perceive B as similar to himself because he likes him or is he attracted to him because he believes that B is similar? It is probable that both relationships hold but here we shall be concerned with the latter. Data bearing on the former will be considered later when we examine findings relevant to the consequents of attraction between persons.

A will like B if B is similar to him in background (race, ethnicity, occupation, age, etc). In a laboratory group composed half of Jewish girls and half of Catholic girls, the girls in each category split their votes equally between Jews and

Catholics before members were identified by religious affiliation; after identification the Jewish girls continued to split their votes but the Catholic girls overchose within their subgroup (Festinger, 1950b). In a subsequent situation where religious identification of the voter was not possible, both Jewish and Catholic girls voted in the direction of their respective subroups. Choice on the basis of similar religion has also been reported by Goodnow and Tagiuri (1952) among boys attending a liberal preparatory school; and Zaleznik, et al (cf. Homans, 1961) found that in a Boston industrial plant persons in the Irish majority were much more likely to be approved and accepted than those of a different ethnic background. Other investigators have reported similarity of occupation to be a basis for friendship choice among adult members of training groups (J. R. P. French, 1951), and similarity in the education and salary of fathers to be a basis for not desiring a change in roommate among freshmen girls (Broxton, 1962).

In a field study by Seashore (1954), the cohesiveness of industrial work groups, measured by responses to questions about the group as a whole, was found to be positively related to within-group age variance, not age homogeneity, and not at all related to similarity in educational level of members. Cohesiveness did correlate positively and significantly, however, with the percentage of members in the group who had had over three years of service with the company. It is not surprising to find that the importance of similarity on particular attributes will vary in different group situations, or, in other words, that homogeneity with respect to a given characteristic will not be related to friendship choices in all groups. Thus, Lazarsfeld and Merton (1954) have reported that within each of two housing communities, Craftown in New Jersey and Hilltown in Pennsylvania, "the degree of similarity . . . of close friends varied greatly for different attributes . . . from the almost complete limitation of intimate friendships among those of the same race and sex, to entirely negligible selectivity in terms of educational status." Further, religion was an important selective factor in Hilltown but not in Craftown where similarity in political values took precedence.

What may be operating in the tendency to make positive choices for individuals similar to ourselves in background characteristics is suggested by the results of two studies reported by Byrne and Wong (1962). In the first, Wong had subjects indicate their feelings about strangers on whom only minimal background data were provided. As expected, highly prejudiced white subjects responded more negatively to a Negro than to a white stranger while subjects low in prejudice did not. The second study tested the hypothesis that highly prejudiced white subjects assume a greater degree of attitude dissimilarity between themselves and an unknown Negro than between themselves and an unknown white person whereas subjects low in prejudice do not. The hypothesis was supported. Of further interest is the analysis of actual attitude similarity; there were no significant differences between a sample of white and Negro subjects on 26 items, indicating that the dissimilarity high prejudiced white subjects perceive between themselves and Negroes is a function of their prejudice. A question is raised by these findings which merits investigation: if we tend to believe that persons who are like ourselves in some salient background characteristic are also similar to us in attitudes, will it also be the case that when A perceives B to share a number of his attitudes that he will assume B to be similar to himself in background?

A will like B if B shares his general orientation (attitude) or specific opinion regarding objects or issues. In a further study by Byrne and Wong (1962), white subjects were provided with both background information and the results of a 26 item attitude questionnaire (dealing with a range of issues from God to television) for either a white or Negro stranger, and asked to indicate their feelings toward (i.e., liking of) the stranger by checking one of seven statements. Half of the subjects were led to believe that the stranger's attitudes were in complete agreement with his own in direction while the other subjects were led to believe that the stranger's attitudes were opposite to his. Personal feelings toward the stranger were found to be significantly influenced only by attitude similarity and not by race of the stranger, or by the subject's degree of prejudice. These data and other findings reported by Rokeach (1960) support the proposition that belief congruence is more important than race in determining interpersonal preference.

Similarity in interests was found to be more closely associated with clique membership than either grade or neighborhood in a study of adolescents in a California high school (Marks, 1959), although the interests which were relatively homogeneous within cliques differed with the sex of the group. From this study it is not possible to determine clearly whether common interests preceded clique formation or whether membership in the same group gave rise to shared interests. In some other investigations, however, there is less ambiguity regarding the independent and dependent variables. Broxton (1962), for example, found that freshmen women who, at the end of five weeks, did not desire to change roommates were more similar to their roommates in certain attitudes, e.g., toward drinking and smoking, than were women who did want to change.

A considerable amount of data relevant to the present hypothesis has been reported by Newcomb (1958, 1961) from a large-scale study of university men, initially strangers, who were housed together in a dormitory. Measures of attitudes toward 100 objects, as diverse as President Eisenhower, house rules, and classical music, were obtained prior to the boys' acquaintance with one another. For the first of two groups of seventeen students, "it turned out that clusters of most closely agreeing individuals, before acquaintance, were those most likely later to constitute cohesive cliques" (1958). The preacquaintance indices of actual agreement did not predict to early sociometric choices but to those made after the first two or three weeks, after, presumably, the men had had a chance to learn one another's orientations to various issues. The attitudes of the men remained, in general, relatively stable while their "high attraction preferences tended to change in favor of individuals with whom they were more closely in agreement" (1961, p. 254). During the early weeks, judgments made by the men about each other's attitudes were related to their feelings of attraction but their judgments tended to be not very accurate. "With the acquisition of new information about each other, estimates of others' orientations tended to become more accurate, and the preponderance of changes in attraction were thus influenced by considerations of reality" (1961, p. 255).

Byrne (1961a, 1961c) has supplied additional data relating attitude scale agreement with liking and has also reported (1961c) that the effect attitude similarity has on attraction varies with strength of affiliation motivation. Subjects high in need for affiliation responded to a dissimilar stranger with dislike but subjects low in affiliation need responded with indifference. It can be expected that attitude similarity will not be given the same weight by all persons when they judge the attractiveness or likability of another individual and, further, that similarity on some attitudes will be more important for some people, i.e., have more influence on such judgments, than similarity on others. Supporting data with respect to the latter expectation have been reported by Newcomb (1961) but both hypotheses are in need of further verification and refinement.

Some studies have shown a relationship between attraction and agreement on a variety of relatively specific issues, as distinct from general attitudes. Festinger, Schachter, and Back (1950) found that in a student housing project consisting of U-shaped courts there was relative homogeneity within courts with respect to attitudes toward a tenant's organization, and that those who deviated from the dominant attitude tended to be rejected on the sociometric question, "who do you see most of, socially?" In another part of the housing area, however, consisting of rows of two-story buildings, the degree of homogeneity regarding attitudes toward the tenant organization was even greater than within the courts but deviates were not rejected. In a theoretical paper, Festinger (1954) reported data from a study by Festinger, Gerard, Hymovitch, Kelley, and Raven (1952) which had not been given in the original research paper. Groups of subjects had studied a labor dispute and then evaluated the union's behavior. After the experiment, the subjects had been asked how well they liked the other persons in their group. "In each of the eight different experimental conditions those who thought that the others held divergent opinions were less attracted to the group" (Festinger, 1954). Gross (1954) found that for some air force personnel interpersonal attraction was associated with common satisfaction with the Air Force, or agreement with respect to personal commitment to Air Force goals, while for other men attraction was associated with shared dissatisfaction with the air site and with their jobs. In one of the housing communities studied

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by Merton and his colleagues, Hilltown, white residents tended to overselect as friends those with the same "racial attitudes" (Lazarsfeld and Merton, 1954). Newcomb (1953), similarly, has reported that in two replications of a study in a small college community, students at each extreme with respect to political attitudes chose, as friends, those like themselves. Altman and McGinnies (1960) have related similarity in ethnocentrism among group members to their attraction to one another. Six man groups, of varied composition with respect to the E-scale scores of the members, viewed and discussed a film dealing with ethnic minorities and prejudice. Low E subjects were found to be more apt to choose other low E subjects on an attraction question while high E subjects divided their choices about equally between highs and lows. High E subjects, however, were not as accurate as were low E subjects in identifying the attitudes of other group members.

One study (Gage and Exline, 1953) has produced negative findings, no association between leisure time sociometric ratings of group members and either their actual or judged similarity in response to a series of opinion items regarding group processes and the study of human relations. Perhaps opinions on these questions were not especially important to the group members and a different set of items might have yielded different results. Newcomb's data (1961) suggest that agreement on some issues is more related to attraction than agreement on others, and that these are the issues about which the individuals are more concerned.

Provocative data within a different kind of research setting have been reported by Gerard (mimeo.). Subjects in a modified Asch situation ranked highest, on a liking scale, that subject who always agreed with them in line judgments and they ranked lowest that subject who never agreed with them. In addition, a group member who switched from disagreement to agreement either very early or very late in the judgment series was ranked higher than one who switched somewhere in the middle. In another investigation of an Asch group pressure situation, Maloff and Lott (1962), though they obtained no data on liking, found that the support of a Negro confederate who switched to making correct judgments was accepted by highly prejudiced white subjects (exposed to erroneous judgments by a white majority) almost as readily as it was accepted by white subjects low in prejudice. Acceptance of support was defined by a change, on the part of the critical subject, from incorrect to correct judgments following such a change by the confederate.

Agreement between individuals A and B, not on issue X, but on their evaluation of another individual C, has also been shown to relate positively to A's and B's evaluations of one another. Newcomb (1956) found that this relationship increases over time among a group of students living in the same dormitory, and Davol (1959) reported that among men in a Veterans' Administration domiciliary those who either liked or disliked another man in common tended to like each other.

If B's agreement with A on C enhances A's attraction to B, we can further suppose that B's agreement with A on A, i.e., agreement with A's self-evaluation, should have the same result. Newcomb (1956) found this to be the case with respect to agreement on both positive and negative traits. Backman and Secord (1962), similarly, found that girls in a sorority house both like and interact most with those girls whom they believe see them as they see themselves (with regard to selected personality traits) and they like least and interact least with those girls whom they believe to have images of themselves at variance with their own. These data were unrelated to differences in the social desirability of the traits.

Deutsch and Solomon (1959) investigated the consequences of agreement on evaluation of task performance. Female telephone company employees were led to believe that they had performed poorly or well on a task and then received either an unfavorable or a favorable note from one member of their group. Although there was a clear tendency for subjects to respond more positively to a favorable note writer under all conditions, when this was held constant it was found that a note writer was more favorably evaluated when her opinion of a subject's task performance was consistent with the subject's own than when the note writer's opinion was inconsistent with the subject's. A further study (Howard and Berkowitz, 1958), has shown that agreement among persons in their evaluation of an individual's performance also affects his attraction to them. Subjects whose task performance was judged by four observers tended to be less desirous of working with the one whose judgment deviated from that of the other three, regardless of whether the deviant evaluation was positive or negative.

A final group of studies relevant to the present discussion are those dealing with the relationship between acceptance of A by B and A's consequent attraction to B, which we reviewed earlier. We assume that, in most cases, acceptance by another is congruent with own feelings toward ourselves, i.e., that self-attitudes tend to be favorable.

A will like B if B's values are similar to his own. The Allport-Vernon Study of Values (or one of its revisions) has been employed in a number of investigations to compare friends with non-friends, or persons who like each other more with persons who like each other less, on similarity of value profiles. Newcomb, for example, has reported a significant relationship between actual similarity in Allport-Vernon scores and attraction (1956), and also between estimates of agreement (i.e., subjects' perceptions of how others would rank order the six values in the scale compared with their own rankings) and liking (1958). This latter relationship was greater after fourteen weeks of interaction among men in a dormitory than it was after two weeks. A. J. Smith (1957), concerned with the causal direction of this relationship, gave to each of his subjects two partially completed Allport-Vernon booklets, one containing responses identical to those previously made by the subject and the other containing dissimilar responses.

Subjects then rated each of the individuals, whose Allport-Vernon booklets they had presumably seen, on their desirability as social companions and as work partners. Acceptance on both measures was significantly greater for the hypothetical person with similar values. Reilly, Commins, and Stefic (1960) have reported a slight tendency in the direction of greater similarity in value scores between friends than between non-friends. In still another investigation utilizing the Study of Values, Jones and Dougherty (1959) found that subjects with high political scores evaluated another politically oriented person favorably, especially when competitive interaction with him was anticipated. When no interaction was anticipated, subjects with a high political value score chose as "liking best" a political rather than an aesthetic person. When, however, scores on Christie's Mach IV scale were used as a measure of political values, contrary findings were obtained. Individuals high on the Mach scale, who can be described as manifesting a strong need to manipulate the social environment, tended to devalue others with a similar orientation. These findings anticipate others to be discussed below which indicate that either similarity or complementarity between persons may function to increase their attraction to one another, depending upon the nature of the characteristic (value or personality trait) and upon a number of other, as yet unspecified, conditions.

A non-significant correlation between value homogeneity and the ratio of in-group to out-group choices made by members of natural college groups was reported by Eisman (1959) and also by Ramuz-Nienhuis and van Bergen (1960) who replicated the Eisman study in Amsterdam. The later investigators noted, however, that an in-group to out-group choice ratio may "not reflect personal attraction very accurately", since feelings about other persons outside the group "will affect the choice ratio, while it has nothing to do with the feelings of personal attraction toward the group members."

Precker, in two studies (1952, 1953), found that students tended to choose peer group members for association after college, and also to choose as college advisers, individuals whose ranking of 39 value categories were similar to their own, without knowledge of the rankings made by the others. The correlation between rankings was highest for mutual student choices. Data reported by Thompson and Nishimura (1952) are also relevant here if we can assume that a person's conception of the "ideal personality" is a reflection of his system of values. Each individual within a sample of eight pairs of best friends filled out a 100 item personality schedule under a number of different instructions, including rating the traits of ideal and friend. Significant positive correlations were obtained between the ideal personality ratings made by pairs of friends and also between the ratings of ideal and of friend by the same individuals. One further study seems pertinent to the present discussion. Thibaut and Kelley (1959) have suggested that it is costly (in terms of effort and expense) to maintain friendships over a distance and that such relationships would, therefore, "be expected to show relatively high value similarity." In support of this hypothesis, they cite data obtained by Williams, et al (p. 41): greater agreement was found between a sample of individuals and their friends residing outside their immediate community than between the same individuals and their friends living close by.

A will like B if B's personality traits are compatible with (similar or complementary to) his own. Lindzey and Urdan (1954) have reported that pairs of students who chose to room together were more alike on personality measures than were those who rejected one another. Similarly, Izard (1960a), using Edwards' Personal Preference Schedule, found pairs of friends to be significantly more alike in profile scores than randomly established pairs. Izard also obtained significant positive correlations between friends but not between random pairs on the specific traits of exhibitionism, deference, and endurance. In another investigation Izard (1960b) demonstrated that the similarity in personality profiles between friends exists prior to their acquaintance.

In a different kind of study, Cohen (1956) paired subjects on the basis of similarity or dissimilarity in ego-defenses, or preference for projection. Following discussion of defense-provoking stories, the similar pairs were found to be more attracted to one another than the dissimilar pairs while the projection preferring pairs were least attracted to one another. These data suggest that sheer similarity in certain personality characteristics may not be conducive to satisfying interpersonal relations but rather compatibility between the traits of one individual and those of the other. That compatibility may require similarity in certain characteristics and complementarity in others is a conclusion which seems to emerge from the available empirical literature. Winch (1955), and Winch, Ktsanes, and Ktsanes (1955), for example, have compared husband-wife pairs with randomly matched men and women on need-patterns, as measured by the Thematic Apperception Test and interviews. Their data indicate (although not strongly) the existence of complementarity among the married pairs especially with respect to the assertive-receptive dimension. In another research context, Gross (1956), studying informal groups within an air force population, found that some groups were composed of men with dissimilar characteristics and that in these ("symbiotic") groups each man seemed to have something to offer the other; other groups ("consensual") were made up of men with similar characteristics who shared a goal or a set of values. Schutz (1958, 1961) has more explicitly defined, and investigated, these two kinds of compatible groups which he calls reciprocal when there is complementarity of three basic interpersonal needs, and interchange when there is similarity in interpersonal needs. He has shown that such groups tend to be productive and cohesive and that their members tend to like one another and to desire continued contact.

Negative evidence has also been reported. Thus, Bowerman and Day (1956), using Edwards' Personal Preference

Schedule, found no support for either homogamy or complementarity in the needs of sixty college couples, regularly dating or engaged; and Hoffman (1958) found no greater intermember preferences within groups that were homogeneous with respect to profiles on the Guilford-Zimmerman Temperament Survey than within heterogeneous groups. A confounding variable in the latter study, however, was the variation among groups in successful problem solution.

A number of studies have been primarily concerned with the consequences for interpersonal liking of similarity not in the actual personality traits of individuals, as measured by some relatively objective instrument, but in the traits which they judge each other to have. Most notably identified with such research on "assumed similarity" is Fiedler. In an early investigation (Fiedler, Warrington, and Blaisdell, 1952) each of a group of fraternity members was asked to describe, by Q-sorting 76 personality items, himself and his ideal self, and to predict how his best liked and least liked fellow members would describe themselves. The results indicated that best liked persons were perceived as more similar to both self and ideal self than were least liked persons. No significant difference in similarity was found, however, between actual self-descriptions made by subjects and best-liked choices, and self descriptions made by subjects and least-liked choices. The results of other studies have also suggested that assumed similarity with a liked person may be greater than actual similarity. Preston, Peltz, Mudd, and Froscher (1952), for example, found that husbands and wives tend to rate each other on specific traits in the same way they rate themselves and that this tendency is greater for happy than for unhappy couples, but correlations between self-ratings were negligible. Similarly, Reilly, Commins, and Stefic (1960), obtained no support for either similarity or complementarity in the actual needs of mutual friends, as measured by the Edwards' test, but among fifteeen correlations of the actual scores of subjects on single personality needs and the scores they predicted for their friends, ten were significant, and positive.

Still other data can be cited which support a relationship between assumed similarity and attraction. Lundy, Katkovsky, Cromwell, and Shoemaker, (1955) found that self-descriptions (on Minnesota Multiphasic Inventory items) were more similar to descriptions made of chosen persons than of rejected ones and, further, that the description of a best-liked person was significantly more similar to a subject's acceptable self (traits described for both self and ideal self) than to his unacceptable self, while the reverse was true of the description of a least-liked person. Finally, Kipnis (1961), from a study of changes in self-concepts, reported that a sample of male freshmen perceived smaller differences in personality between themselves and those whom they chose for a variety of friendly, interpersonal contacts than between themselves and those they liked least.

In some investigations, the personality traits of individual members have been determined by means of group judgments.

Utilizing such a technique in three separate groups, Maisonneuve (1954) found that "people who are attributed similar profiles tend to mutually choose each other, or . . . people characterized in a similar way tend to associate." In a study by Zimmer (1956) a measure of the "behavior tendencies" of group members was obtained by pooling the rankings (on eight dimensions) made by the members of each other. A trend was found in the direction of greater disparity between the judged personalities of subjects and their choice of discordant (annoying) group members than between the judged personalities of subjects and those group members they considered harmonious. Still another variation in procedure and measurement can be found in an investigation by Stotland, Cottrell, and Laing (1960). They asked each subject, following interaction with others on a task, to predict how the majority of the members in his group would respond to a thirty item personality questionnaire, and also to respond to it himself. When only subjects of no prior acquaintance were considered, those who indicated a high desire to get to know their fellow group members differed from those with low desire in perceiving the majority of the group as significantly more like themselves.

The findings reviewed above relevant to the relationship between assumed or judged personality of others and attraction do not, for the most part, provide a satisfactory answer to the question of causal direction, i.e., whether A's perception of similarity between himself and B disposes him to find B attractive or whether A tends to see in a likable B personality characteristics which are congruent with his own. We have assumed, from the context of the investigations reviewed in this section, that they bear on the former relationship; later on we will consider others which seem more clearly relevant to the latter.

When we put all the evidence together, there can be little doubt that individuals tend to prefer friendly associations with others who are compatible to themselves in interests, values or personality. It has also been shown, however, that under certain circumstances a person may choose to work on a particular task with a dissimilar fellow. Lerner and Becker (1962) demonstrated that a similar person is preferred for interaction in a mutual gain or non-competitive situation while a dissimilar person is preferred for competition. No data were gathered on liking but the results seem to suggest that the similar individual is the more likable since we prefer to share rewards with him. A related investigation was conducted by Israel in 1956 (cf. Homans, 1961). Each subject saw both his score, on a series of logic tests, and that of the other members of his group. Each subject believed his score to be average while those of his fellow members varied from high to low. Subjects were then asked to rank-order the others in his group with respect to their continuance in the group for the further solution of logical problems. Under a condition where reward would be based on the group's total score, choices tended to go to high scorers; under a condition where reward would be based on score homogeneity among group members, choices tended to go to other average scorers; and under a condition where reward would depend on individual performance, choices tended to be directed toward low scorers. Again, these results do not indicate liking but suggest, simply, that work partner preferences will be made in such a manner as to maximize personal gain, although it was also the case that, over-all, high scorers were most preferred. This investigation brings us to a bridge leading to another sizable group of studies concerned with attraction as a function of one's own success on a task and also as a function of the success or reward accruing to others.

Success-reward.

A will like B if both are rewarded by an external source or are members of a successful team or group. Typically data relevant to this generalization have been obtained from experiments in which the success or failure of small groups, working on a single task or series of problems, has been manipulated. Utilizing such a design Shelley (1954) found that members of successful groups had a more favorable attitude toward their group than did members of groups experiencing failure. Steiner and Dodge (1956) in effect manipulated success and failure by interfering, in one condition, with messages sent by group members to one another via lights and buttons. In this condition ("perceptual inaccuracy") incorrect messages were received while in another condition there was no interference and hence "accuracy". When no specific rules had been provided by the experimenter for members to follow in performing their task (design reproduction on a checkerboard), the former condition was significantly associated with less task efficiency, with more criticism of the group, and with greater rejection of own group members for a new task. Working with groups of second and fourth grade children, Heber and Heber (1957) gave some a high score on an arithmetic test, some a low score, and some no score and then measured changes in the mean ratings group members gave one another on a social distance scale. Under the low score condition the ratings decreased; under the success or neutral condition they increased, with the effect showing greatest permanence after success. Pepitone and Kleiner (1957) introduced the threat of losing a game tournament to high status (winning) teams. Where this threat was negligible, intermember attraction increased significantly more than within high threat teams. Between low status (losing) teams told they would probably win and those told they would probably lose, however, there was no difference in subsequent in-group choices. It is unfortunate that there are no data reported on the level of interpersonal attraction within the winning and losing teams after they had experienced success or failure and prior to the introduction of other variables.

In a study of attraction and personality similarity in which group success was not manipulated, Hoffman (1958) found that in homogeneous groups, successful problem solving by the group was positively correlated with intermember attraction.

More recently Zander and Havelin (1960) investigated interpersonal liking as a function of variation in the task competence of trios within larger nine-man groups. Subjects in the most competent trios made significantly more work-partner choices and fewer rejections within their own sub-group than did subjects in the poorest trios. Similar findings obtained on a scale of general attitude toward the subgroup. (The perception of similarity among subgroup members on characteristics other than task competence was also manipulated and found to have a greater effect on the peer choices and group evaluations of subjects in the poor than in the successful trios.)

Both Wilson and Miller (1961) and Myers (1962) studied the effects of success in competitive situations and utilized, as measures of liking, personality ratings made by each member of every other. In the first mentioned investigation, winning was associated with a larger positive shift in the ratings given to own teammates than was losing; in the second study, high success teams increased significantly in esteem for their teammates while esteem for teammates diminished in low success teams. Phillips and D'Amico (1956) had earlier reported that within groups in which members competed against each other, where rewards were evenly distributed, there was either no change or an increment in within-group choices on a sociometric question, in contrast to groups in which rewards were not evenly distributed, where within-group choices decreased.

Both Deutsch (1959) and Zander, Stotland, and Wolfe (1960) have reported data indicating a positive relationship between group success and the attractiveness of the group as a whole; in the latter investigation, however, responses to a scale measuring attraction to members of the group did not differentiate between subjects in failing and successful groups. There have been other reports of equivocal or negative findings. Thibaut (1950) found that groups of boys who tried to obtain better treatment from the experimenter and failed, significantly increased in cohesiveness (as measured by proportion of own group choices) while groups of boys who were successful in improving their status did not. This difference in heightened attractiveness of own group members held, however, only between the central (more popular) members and not between the peripheral members of unsuccessful and successful groups. In a number of other studies the experience of common failure has been shown to influence the choice of one failing subject for another on a variety of criteria. Shaw and Gilchrist (1955), for example, found that after a sequence of task failures, subjects chose among themselves for friendly association more than they chose successful individuals. The failing subjects, however, had experienced interaction only with each other. Berkowitz, Levy, and Harvey (1957) found that subjects who were highly task motivated and received unfavorable evaluations of their task performance subsequently rated each other as high in attractiveness (on both work partner and social companion criteria) as did highly motivated subjects who received favorable evaluations. Burnstein and McRae (1962) studied groups of four white subjects and one

Negro confederate in a situation where group members, separated by vertical partitions, communicated by means of written messages to solve logical problems cooperatively. Following evaluation of a group's performance, highly prejudiced white subjects rated the Negro higher on a liking scale when the evaluation was poor than when it was good. For white subjects low in prejudice, the performance evaluations made no difference in their rating of the Negro. Unfortunately, there are no data on the white subjects' ratings of one another on the liking scale under the diffenent conditions.

Is the experience of common failure by members of a group interpretable as shared threat or stress emanating from a source external to the group? It would be helpful, relevant to this question, to know whether subjects in unsuccessful groups view their common failure as arbitrarily imposed by the experimenter or as due to their own lack of ability. In the former case, but not in the latter, heightened interpersonal attraction would be expected. Pepitone and Wallace (cf. Pepitone, 1958) have shown that when subjects consider their failure arbitrary or unjustifiable they dislike the investigator more than otherwise, but no data were reported on attraction to other group members. We may make use of the Pepitone and Wallace findings, however, in inferring that arbitrariness of evaluation probably did not operate as a variable in the Burnstein and McRae study (1962) since there were no reliable differences between the favorably and poorly evaluated subjects in their ratings of the tests' "fairness" or in how much they "liked" the experimenter. It is possible that the Burnstein and McRae findings are specific to evaluations which prejudiced white persons make of Negroes, i.e., Negroes are more attractive to such white persons when they are poorly evaluated than when they are favorably evaluated. Other data obtained in the same investigation suggest that this may be the case. Favorably evaluated subjects rated the communication skills of their fellow members significantly higher than did unfavorably evaluated subjects but the Negro confederate was considered less skillful compared with the average group member by members of successful than by members of unsuccessful groups. Findings from another study (Katz and Cohen, 1962) also suggest that white persons may be less attracted to a skillful Negro, regardless of their own effectiveness. Teams composed of one Negro and one white subject solved problems cooperatively. In one condition ("assertion training") the experimenter varied the information available to each partner so that only one could confidently propose the correct solution, but each partner was favored with the better information on half the problems. In the other condition ("no training") neither partner received sufficient information to permit him to propose the correct solution confidently. Following this experience the Negro subjects in both conditions expressed the same degree of preference for their partners (for a future experiment) but the white subjects who received "assertion training" preferred their Negro partners less than did those in the "no training" condition.

Equivocal findings with respect to the general proposition that interpersonal attraction will be greater in successful than in unsuccessful groups have been reported by Kleiner (1960). In group situations where one member was clearly responsible for improving group performance (or, more accurately, decreasing the "likelihood of failure") there was no significant increase in subjects' ratings of each other, but only in their ratings of the one member responsible for the improvement. On the other hand, in the condition where there was only a small reduction in likelihood of failure, group members tended to depreciate each other, apparently "holding each other responsible for the relatively small improvement."

A will like B if B is the source of, or instrumental in obtaining, reward for A. As in the case of shared failure, shared success, too, may be seen as emanating from an external source, in a more or less arbitrary fashion, or it may be perceived as due to the skill, or other characteristics, of one's fellow group members. Such a distinction could not be made unambiguously in the case of the investigations discussed in the preceding section. Here we will consider research which has measured the attitudes of reward recipients toward those who were more or less directly responsible for the satisfying state of affairs.

The study cited above by Kleiner (1960) bears directly on the proposition here considered. Groups of two subjects and one "stooge" worked on puzzles and their ability to solve problems was compared with that of business executives. In each group the stooge was clearly instrumental in improving group performance. When the improvement produced a large reduction in threat of failure, consequent liking and desire to know the confederate was significantly greater than when threat reduction was small. Attraction to the helpful stooge also tended to increase more in groups under initially high threat of failure than in groups under low threat. A somewhat similar design was used to test a related hypothesis by Ziller and Behringer (1960). Groups solved problems and were informed of their success or failure. Into each group, then, a new member was introduced and a more difficult problem (which he could solve) was presented. The newcomer was rated higher by subjects in previously failing groups than in previously successful ones; it was in the former groups, of course, that his presence was associated with the greater improvement in group performance.

Earlier, Jennings (1950) reported that girls highly chosen by others to live or work with were sources of need-gratification and she suggested that choice on such criteria "may, in a sense, be considered 'earned' by the person chosen" (p. 165). Horwitz (1958) found that in an experimental simulation of a classroom situation, the teacher was significantly more liked and was evaluated more positively on personal characteristics when he behaved in accord with the students' desires to repeat parts of a lesson than when he behaved in accord with his own desire, contrary to that of the students'. In a different kind of situation (Solomon, 1960), subjects who communicated with unseen partners via electric switches developed greater liking for those partners whose game strategy provided them with maximum gain. Also reported have been data supporting a relationship between the feeling that one has influenced others (which we can assume to be gratifying or rewarding) and the liking of these others (Zander and Cohen, 1955; Tagiuri and Kogan, 1960).

Two studies have indicated that behavior by one person which is generally considered rewarding to another will not be so under all conditions. Howard and Berkowitz (1958) have reported that when judges disagree in their evaluations of a person's performance, the deviant judge tends to be seen as probably in error and tends to be rejected on a sociometric question regardless of whether his evaluation was positive or negative. Related findings were reported by Deutsch and Solomon (1959). Although subjects in their experiment tended, generally, to respond more favorably to persons who evaluated their task performance positively, they were less favorable if they had been led to believe by another source that their performance was poor, and under this condition they responded favorably to a negative evaluator. It appears as if a "correct" judgment may constitute desired behavior in situations where individuals receive feedback about their actions from more than one source and adopt either one or the majority evaluation as their standard.

A will like B if A has been rewarded in B's presence. This generalization differs from the two preceding ones, at least in principle, in that A's attraction to B does not depend upon B's having also shared success within the same group nor upon B's instrumentality in obtaining reward for A; B's presence when A experiences a satisfying state of affairs is hypothesized as being a sufficient condition for enhancing A's attraction to B. The first two conditions have not, unfortunately, always been clearly absent in the investigations we will consider below.

Bass (1955) had subjects in a group rank words according to high school boys' familiarity with them, first privately, then after group discussion, and then again privately, followed by the correct ranking given by the experimenter. Each person's own success or failure was found to be a significant determiner of his attraction to the entire group. Group goal attainment in this study was unrelated to individual attainment which was primarily a function of individual competence. Similar data have been reported by Spector (1956). Among men operating in the laboratory as military intelligence decoding teams, those "promoted" to sergeant judged their team as being significantly more attractive, and desired to remain within it, more than those not promoted. Further, among the promoted subjects, those who believed the probability of promotion to be low were even more favorable in judgments of their group than were those who believed the probability of promotion to be high. Although it is not clear what the achievement of higher status would depend upon, it is doubtful that the subjects believed their teammates to have been instrumental in their promotion or non-promotion. An experiment by Lott and Lott (1960) was specifically designed to test the proposition under present discussion. Three-member groups of children played a game in which some members were successful and others were not. Later, on a sociometric test given outside of the game situation, the successful children chose a reliably greater proportion of their fellow group members than did the unsuccessful children. Whether the former believed that their fellow members had contributed to their success is a question on which, unfortunately, no data were obtained. James and Lott (in press) extended the above experiment by varying the frequency of reward obtained in the presence of others and by using an additional test of attraction to group members. On each of the tests significantly more of the subjects who received six rewards chose fellow members than did those who received three or no rewards; no reliable differences were found between the latter two conditions. In both this and the previous study the number of rewarded subjects within each group varied and later examination of the data has revealed some tendency for rewarded subjects to prefer other rewarded subjects.

Indications that certain personality factors may affect the influence which one's own success or failure has on our affective reaction to others may be found in data reported by Stotland (1959). Members of small groups first worked together, then separately. In the latter condition some failed and others succeeded on either a group relevant or irrelevant task. Attraction to the group was then measured by two questions: would you like to meet with the group again; and how much do you like the other members? Success on the individual tasks was associated with reliably more attraction to the group than was failure, but among those who failed, subjects with high self-esteem found their group more attractive than subjects with low self-esteem. There was no reliable difference between high and low esteem subjects who succeeded.

Negative findings with respect to the proposition here considered have also been reported. Rosenbaum (1959) found no reliable difference in responses to a social distance scale (regarding their partners) between subjects who failed and those who had succeeded on a discussion task. Instead subjects who were given no feedback about their performance liked their partners significantly more than did those given either favorable or unfavorable evaluations. It may be important that half the subjects were told that both partners would fail or succeed together while the other half were told that if one partner succeeded the other would fail. No measure of the interaction between this cooperation-competition variable and success-failure is given.

A will like B if B has performed successfully on a task or received reward. Gilchrist (1952) found that successful individuals tend to be chosen for further activity by both other successful and unsuccessful persons. While this kind of choice does not necessarily indicate "liking", Gilchrist also reported generally greater choice of successful subjects for social interaction (speak to at next meeting, have coffee with, double date with). Berkowitz (1957a) reported, as an incidental finding in a study designed to test another hypothesis, that subjects liked their partners (simulated) better when the latter were supposedly proficient on a task than when they were supposedly poor. In another investigation (Berkowitz, Levy, and Harvey, 1957) where the performance of group members was evaluated by "experts", highly task motivated subjects generally indicated greater attraction to favorably evaluated than to unfavorably evaluated group members, on both work partner and social companion questions. In still another relevant study, by Stotland and Hillmer (1962), similar data were obtained: subjects tended to show a greater desire to converse with a hypothetical person they were told was good at a task than with one they were told was poor.

What the effect one's own success or failure may have on the tendency to find a successful other attractive is an important question on which empirical attention needs to be directly focused. Existing data have not clarified the nature of the interaction between the variables of own goal attainment and others' in affecting interpersonal attraction. It is probable also that the interaction will vary from one set of circumstances to another. We have already seen that in certain cases unsuccessful persons show a preference for others who are "in the same boat", but the general nature of conditions under which this occurs is far from clear. We have also seen that when a white person and a Negro are equally competent on a task, the former tends to find the latter less attractive (because it violates the white person's expectations or reduces the value of his own attainment?). It is possible that under still other conditions the variables of own and other's success may operate independently so that an individual will be more positively disposed toward the members of his group, or toward persons in his immediate environment, following his receipt of reward but his attraction toward other rewarded persons will be even greater than that toward nonrewarded ones.

The bulk of the evidence reviewed in connection with the generalizations regarding success or failure as antecedents of liking suggests that they are basically valid but that future research should concentrate on specifying the particular conditions under which each proposition is most apt to hold.

Reduction of cognitive dissonance

A will like B if A has behaved in a manner relative to B which is dissonant with his cognition of B's unattractive characteristics. This generalization assumes that A's experience of dissonance will be reduced by finding B more attractive than he did previously and that alternative methods of reducing dissonance are either unavailable or less likely to occur for one reason or another.

Supporting data have come from an investigation by

Aronson and Mills (1959). They predicted that persons who undergo an unpleasant initiation in order to gain admission to a group and then find that the group has not been worth such pains (a dissonant cognition) will consequently exaggerate the group's positive characteristics. An alternative way to reduce the dissonance, by convincing oneself that the initiation was not very unpleasant, was made unlikely by the use of a severe initiation condition involving the reading aloud of obscene words. University girls undergoing this procedure were expected to find the group into which they were accepted more attractive than girls who were accepted without undergoing an initiation or whose initiation was "mild". After the subjects heard a "very dull" taped discussion, presumably being carried on by the group, they rated both the discussion and the participants. Responses to both measures supported the hypotheses.

It may be important that in this experiment the subjects were accepted into the group. It is possible that acceptance after a severe initiation is more valuable, more rewarding, than acceptance after a mild or no initiation. A condition of no-acceptance following the initiation procedures, with the same dull discussion and its participants subsequently evaluated, should provide worthwhile data.

Schopler and Bateson (1962), to test another alternative explanation of the above findings, replicated the Aronson and Mills study under somewhat altered conditions of subject recruitment and the addition of two new experimental groups.

They found that subjects in the Severe initiation condition rated the content of the dull group discussion significantly higher than did ~~subjects~~ in a mild initiation condition (Control), thus confirming Aronson and Mills. Subjects who received a severe initiation, however, and also heard the experimenter *disparage* the discussion, did not differ in their ratings of the discussion from the Control subjects and made reliably lower ratings than did subjects in the Severe condition. Working within the Thibaut and Kelley (1959) theoretical system, Schopler and Bateson explain their results by arguing that in the Severe condition, high dependence upon the experimenter is produced and, thus, a greater necessity for subjects to increase their power. "One of the likeliest ways of increasing power which was available . . . was to conform to the opinion of the E [experimenter], who strongly implied that the Ss [subjects] would like the discussion." In the Disparage condition, introduced by Schopler and Bateson, where the experimenter predicted to the subjects that the discussion would probably not be good or exciting, the subjects rated the discussion low. Another condition introduced by Schopler and Bateson yielded ambiguous results. Of more concern to us are the findings with respect to ratings of the discussion *participants*. Although Severe condition subjects rated the participants higher than did either the Control or Disparage condition subjects, none of the differences were reliable.

There is no equivocation in the findings of Lerner and Becker (1963), who have also tested a cognitive dissonance hypothesis. Persons who were induced to choose an "undesirable", as opposed to a "desirable" work partner, rated him as more attractive if they received no monetary reward for their joint activity than if they did receive payment. On the other hand, when subjects were compelled to work with the "undesirable" partner, i.e., had no choice, they subsequently rated him as more attractive if they were rewarded with money than if they were not. In the no-choice situation, successful performance and monetary gain operated to increase the partner's attractiveness, as previous research would lead us to expect. According to Lerner and Becker, dissonance was not created since subjects were compelled to work with an undesirable partner. On the other hand, choice of the "undesirable" partner (to enable him to be paid for his participation in the investigation), is considered dissonance arousing and the dissonance can be reduced by developing positive attitudes toward the partner. If a subject is given a reward for successful performance, however, he does "not have to bother reducing dissonance by altering his cognitions. The cognition of receiving money could reduce or eliminate the dissonance . . ." Although the data obtained by Lerner and Becker are unambiguous, we do not find their explanation similarly so. If dissonance is eliminated in the choice-reward condition it is not clear why the reward should then not also have had the effect of increasing attraction to the partner, as it did in the no-choice situation where it is assumed that no dissonance was present from the outset.

## Antecedents of Liking: Theoretical Expectations

The foregoing review of research, organized in terms of empirically tested relationships between a variety of conditions and consequent interpersonal attraction, should, we believe, have demonstrated at least one point. If we define the cohesiveness of small groups in terms of the positive judgments which members make of one another, then a great deal is known about the conditions under which cohesiveness is likely to develop. We suggest that the conclusion of Cartwright and Zander (1953, p. 80; 1960, p. 79) that there is "very little systematic knowledge about the conditions which heighten cohesiveness" is not an accurate reflection of the present state of affairs, although perhaps we would do best to remove the qualifying adjective "systematic." We must, similarly, question Shaw's statement (1961) that little sound research has been carried out in an attempt to investigate group development. We do share, with Shaw, the conclusion, that there is "a tendency to ignore much of the literature relevant to the problem under consideration . . . in both theoretical works and research reports." This state of affairs is no doubt related to the vastness of the existing literature as well as to its generally atheoretical nature.

We turn now to a consideration of theory, to attempts which have been made, in other words, to predict specific relationships on the basis of a set of more general principles.

## Balance or congruity

Heider. Most clearly identified with the above position, as explicitly related to the question of attraction between persons, is Heider (1946, 1958). His most basic concept, that of the "balanced state" refers to a situation in which the perceived units (i.e., persons in a subjective relationship, or person and some object or idea), and the experienced sentiments (i.e., like or not like) "co-exist without stress" (1958, p. 176). He maintains that under most conditions there is a general tendency towards a balanced state, that this is the preferred state of affairs. From this general principle follow a number of specific predictions.

We will consider here only those predictions in which sentiment formation is the dependent variable: a person tends to like a similar individual (but not when the similarity carries with it disagreeable implications, as for example when the other individual has the same disability as the person); a person tends to like another with whom he has contact (but not if continued interaction yields the perception of dissimilarity with the other); a person tends to like a familiar other (but not if the other is dissimilar). In each of the above hypotheses it is B's similarity to A which underlies A's attraction to him. Further, if another individual's behavior is perceived as congruent with a person's values, the person will tend to like the other. Whether similarity is implied by "balance", or whether it has some other value, is not clear. We may note Heider's statement that ". . . it is satisfying to find support for one's own view" (1958, p. 196) but we are not sure whether support for one's own view is seen as "satisfying" a person's need for balance, i.e., because A relates to B they should be similar to one another to achieve a balanced state, or whether support for one's own view "satisfies" a different motive. Since balance is said to be achieved "if the relations between . . . entities are all positive" (1958, p. 202), it may be that Heider considers similarity to be intrinsically positive.

There are two other relevant hypotheses which are, at least superficially, unrelated to similarity: a person tends to like another whom he has benefited, and also one who has benefited him. To be benefited by a person one dislikes, or to benefit someone one dislikes, would obviously be disharmonious or incongruous.

All of the above predictions have been supported, to varying degrees, by empirical data although surprisingly few investigations have been explicitly designed to test Heider's system. More often, the hypotheses tested in relevant research have been unrelated to any systematic point of view, or have stemmed from other positions. Heider's influence is apparent, however, in other theoretical formulations. Newcomb (1953), for example, has similarly built a system around the basic principle of balance, postulated a "strain toward symmetry", and stressed the role of similarity between persons as the major determinant of attraction. We interpret Newcomb's more recent position, however, as more relevant to a reward framework and will, therefore, return to it below.

Festinger. The increasingly influential theory of cognitive dissonance has been applied to the prediction of behavior in social contexts in a paper by Festinger and Aronson (1960). This theory, too, focuses on balance and rests upon the basic assumption that individuals who experience simultaneous cognitions which are contradictory or inconsistent with one another will tend to reduce this incongruity (dissonance) by changing one of the cognitions in the direction of consistency with the other.

Regarding the problem with which we are here concerned, Festinger and Aronson have suggested that liking for an individual or group of persons may be a dissonance reducing mechanism. When, for example, a person has invested time or effort in order to interact with other persons and then finds that they are less pleasant than he had anticipated, he is faced with dissonant cognitions. "There are at least two ways that a person could reduce dissonance in such a situation: (a) he could undervalue the amount of his investment . . . or (b) he could overvalue the group by emphasizing its positive aspects . . ." We have previously considered evidence relevant to this hypothesis.

## Reward

It is possible to find reinforcement propositions within the more recent theoretical statements of a great many social psychologists (e.g., Bass, 1961; Allport, 1962; Miller, 1963). It is, for example, taken for granted that individuals are attracted to groups as a direct function of the satisfaction they are able to derive within them. Our particular interest here is in more explicit propositions regarding attraction to individuals.

Lazarsfeld and Merton. Although these writers have stressed common values as the dominant factor in friendship formation, the variable of reward seems, nevertheless, to be more primary. "For those with similar values," they suggest (1954), ". . . social contact, because it is rewarding, will motivate them to seek further contact." In some cases friendships will form before the individuals become aware that they differ on particular issues. If there have been sufficient prior rewards, i.e., sufficient areas of similarity, then some disagreement can be tolerated but the tendency will be to modify opinions and come closer together, if the friendship is to endure, since "common values make social interaction a rewarding experience." They suggest that the most critical evidence with respect to this question might well be obtained from data on broken friendships.

Newcomb. Resembling the above in general outline, Newcomb's position is more detailed and refined. He has chosen to distinguish between attitudes toward objects and attitudes toward persons, using the term "attraction" to refer to the latter (1956), and postulated that the reinforcement which one person experiences as he interacts with another is the major independent variable determining attraction to the other.

Specifically, positive attraction is conceptualized in terms of reward-associated attitudes, and negative attraction in terms of punishment-associated attitudes (1960). Thus, behind the relationship between propinquity and attraction, according to Newcomb (1956), is the fact that "when persons interact the reward-punishment ratio is more often such as to be reinforcing than extinguishing." In the same vein preference for persons resembling others whom we like is accounted for by the "principle of generalization", i.e., thresholds for interaction with such persons are lower and "the likelihood of the rewards of interaction with such persons is greater" than for others (1956).

Perhaps Newcomb's most unique contribution to systematization in this area has been his emphasis on the role played by communication in the maintenance of friendship. Communication is recognized as the major interaction process through which individuals can reward one another. In addition, accurate communication is, in itself, rewarding, and consequently "reward value will attach to the co-communicator--which is to say that positive attraction toward him will increase (other things equal) with frequency of accurate communication with him" (1956).

Similarity between persons, again because it is rewarding, is said to account "for more of the variance in interpersonal attraction than does any other single variable" (1956). Newcomb has refined this relationship by noting that similarity, to be an effective determiner of interpersonal attraction, must refer to attitudes toward valued objects, i.e., those which are "important and relevant" (1958). "An individual tends to be attracted toward others who are seen as viewing as important the same things that he himself regards as important, and as taking attitudes toward them that are similar to his own. Upon first acquaintance, persons are 'scanned' for clues to their attitudes, but initial judgments are not likely to be very accurate about a very wide range of objects. At first, therefore, attraction should be more closely related to perceived than to actual agreement. Given ample opportunity for association and communication, judgments tend to become more accurate" (1958). These predictions have been verified in Newcomb's own research (1961).

From the above it is clear how Newcomb relates proximity to similarity and then to attraction. It is only to the degree that proximity "facilitates the development of perceived similarity of attitude" that it contributes to attraction (1956). Communication is also related to similarity since the latter tends to result from the former, at least with regard to the object of communication, and both accurate communication and similarity are independent sources of reward (1958). In like manner, the fact that individuals are attracted to persons who reciprocate their feeling is seen as "a special case of perceived similarity", assuming that self-attitudes tend to be favorable.

Newcomb (1960) is also concerned with the categories of reward which are significant to interpersonal relations and has distinguished among admiration (A attributes likable characteristics to B); reciprocation (A perceives B as liking him); and perceived support (A attributes to B attitudes similar to his own). A's attraction to group members would then depend upon two major parameters: his "hierarchy of 'appetites' for reward" (his motives), and "the reward possibilities that other members have to offer."

A considerable body of data already provide support for the major predictions within Newcomb's theory. Most valuable for future research would, we believe, be exploration of the manner in which the parameters mentioned in the preceding paragraph function in determining attraction.

Homans. In his recent book (1961) Homans has strongly embraced modern learning theory as a source of principles regarding social behavior. As compared with Newcomb, therefore, Homans' theoretical propositions are more explicitly phrased in behavioral terms but both systems depend upon the basic concepts of reinforcement and punishment.

Homans is concerned with both activities (overt behavior) and sentiments (overt behavior which provide visible signs of internal attitudes and feelings), but since the former concept includes the latter, no separate sets of propositions are required. A primary assumption is that the activities and sentiments which one individual emits, in response to another, are reinforcing or punishing to some degree, or "more or less valuable" to the other (p. 34); special stress is placed on social approval (a sentiment) as a generalized reinforcer. The value of a reward to a person will depend upon his relatively constant past experience (his genetic and cultural character) and his present state of deprivation. "Costs" are subtracted from reward to measure the individual's "profit", or net reward.

In Homans' terms, "cohesiveness refers to the values of the different kinds of rewards available to members of the group: the more valuable to a group's members are the activities (or sentiments) they receive from other members or from the environment, the more cohesive it is" (p. 88). With regard to interpersonal attraction, the following major hypothesis is derived from the general assumptions: the more valuable a person's activities are to others, the greater is the esteem in which he is held (p. 164). From this, in turn, follow certain specific expectations, for example: persons will provide more value to one another if they share the same orientations, or have similar backgrounds (p. 214f); because some individuals provide the most value to others, mutual choice will be greatest among high esteem, or overchosen, persons (p. 164f); individuals tend to prefer high status individuals because such individuals have most likely acquired their status by rewarding others and hence they are associated with the expectation of reward (p. 314).

Homans has suggested, further, that men tend to value "fair exchange", or "distributive justice." This "is realized when the profit . . . of each man is directly proportional to his investments: such things as age, sex, seniority, or acquired skill" (p. 264). From this follows the specific expectation that a condition of status congruence among persons will be conducive to mutual esteem or congeniality.

The relationship between interaction and favorable sentiments is also explained on the basis of the value derived from the interaction: "the chances are that each one [of an interacting pair, for example] will find some of the other's activities valuable, if only because they may be obtained at less cost from him than from a third party at a greater distance: the distance of a source of reward adds something to the cost of getting it" (p. 183f).

Homans has considered the contradictory findings which have been obtained with respect to the liking of leaders. He points out that a man "earns authority by acquiring esteem, and he acquires esteem by rewarding others" (p. 314), but since a man holding authority is likely also to incur costs on others by use of punishment or simply by depriving others of the chance to be the leader, the sentiments which develop toward him are likely to be ambivalent (p. 299f).

Homans and Newcomb offer similar predictions from similar frameworks, but Homans' specific accounting of "costs" has permitted a more detailed explanation of certain phenomena. Investigations designed to test the hypotheses relating both rewards and costs to esteem, or liking, are needed.

Thibaut and Kelley. An analysis of social behavior strongly resembling that of Homans' has been published by Thibaut and Kelley (1959). Although the Homans' book (1961) which we have cited above appeared subsequent to that of Thibaut and Kelley we are considering the respective systems in the present order because they seem to fall best into these positions on a continuum of similarity.

Like Homans, Thibaut and Kelley analyze social interaction in terms of rewards (satisfactions or reduced drives) and costs (physical or mental anxiety which serves to inhibit performance). In addition, they introduce the concept of control, which is described as mediated by one's ability to affect the outcomes of another's behavior. Thus, ". . . the problem that confronts a number of people if a continuing relationship among them is to be viable . . . is defined in terms of the possibilities the participants have for contributing to or detracting from each other's outcomes" (p. 4).

A unique feature of the Thibaut and Kelley approach is its distinction between two evaluative standards which persons apply to the outcomes, i.e., to the rewards and costs, of interaction. One standard is in terms of what the person feels he deserves, based on his past experience and present motivation (the comparison level), while the other is in terms of available alternatives, and is the lowest level of outcomes which the person will accept (the comparison level for alternatives). A person's dependence upon a group (or another individual) is said to be a function of the latter, but his attraction to the group or other individual depends upon the former. The two evaluative standards, however, are not independent. "Since outcomes from the best alternative relationship are included among those that determine the CL [comparison level], the CL and $CL_{alt}$ [comparison level for alternatives] will tend to be positively correlated," and so, then, will be dependence and attraction (p. 102).

It is with attraction that we are concerned, and Thibaut and Kelley (p. 24) propose that a "person's attraction to a dyad depends upon his evaluation of his outcomes in relation to his CL . . ." Specific relationships between antecedent variables and interpersonal attraction are explained in terms of both "_ability to reward_ each other and the _cost of providing this reward_." Value similarity is important to friendship because "in many value areas an individual is in need of support"; agreement is therefore rewarding. "In other words, provision of opinion support may be considered as having learned reinforcement value" (p. 42). Where complementarity contributes to the rewards obtained from interaction, then it will be positively related to attraction (p. 47). Similarly, we tend to prefer high status people because they "have greater extrinsic means . . . for rewarding others", or association with such persons may simply provide the reward of "prestige" (p. 48).

_Other reinforcement formulations_. The theories of Homans, of Thibaut and Kelley, and to a somewhat lesser extent, that of Newcomb, are concerned with the entire sphere of social behavior. We have selected only what we believed to be most relevant to the present problem. Other formulations have been more narrowly concerned only with attraction among persons.

Pepitone (1958), for example, maintains that the simple common assumption that attraction to an individual "depends upon the amount of 'reinforcement' or 'need satisfaction' obtained from that person . . ." is far too general to provide an understanding of determinants. "What we want to know is what particular factors reinforce, reduce tension, etc. . ." He has suggested that important dimensions are those of responsibility (for an act), intentionality (i.e., good, bad, or none), and justifiability (on some logical, social, or ethical standard). According to Pepitone, each of these has a predictable relationship with attraction: A's attractiveness to B will vary with the degree of B's responsibility for positive or negative acts, with B's intentions, and with the degree of justifiability of the positive or negative acts. These factors vary the value to one individual of the specific behavior of another; they weight the value (valence) of acts, and it is the value of his acts which determines the attractiveness of the actor. Status is related to attraction, for example, via the mediation of the above constructs since high status persons will be seen as more responsible for an improved state of affairs, as having good intentions, and as being justified in their behavior.

A number of empirical studies, referred to earlier in this paper, designed by Pepitone and his co-workers to test his predictions, have yielded generally positive results.

Hypotheses regarding attraction among group members have been derived from the general propositions of Hullian behavior theory by Lott (1961). Attraction is rephrased in terms of positive attitudes and defined, following Doob (1947), as implicit, anticipatory goal responses. On the basis of a sequence of learning theory principles, it is expected that stimuli associated with reinforcement can eventually evoke the implicit and anticipatory component of the response to reinforcement, the goal response. Hence, the "primary condition for the development of mutual positive attitudes among group members" is said to be "the attainment of goals or the receipt of rewards in one another's presence." Secondary hypotheses regarding antecedents take into account frequency of reward and delay of reward. It is also predicted that the more closely or the more frequently a particular group member is related to the achievement of goals, the greater will be the strength of the positive attitudes developed toward him. This latter hypothesis may be interpreted as relevant to status and leadership. Studies designed to test this formulation have been cited earlier; other investigations are in progress.

Overview. There is clear agreement among many contemporary theorists that attraction will follow if one individual either directly provides another with reward or need satisfaction, is perceived as potentially able to do so, or is otherwise associated with such a state of affairs. Furthermore, the specific antecedent variables which empirical research has shown to be related to inter-personal attraction can, for the most part, be interpreted in support of this general proposition. The data on propinquity, group climate (including cooperation, democratic leadership, etc.), acceptance, status, personality characteristics, similarity (or complementarity), and success, are all predictable from a general reinforcement position. It is more difficult to deal with the research findings on mutual threat or failure. If it can be shown clearly, however, as some investigators have suggested, that mutual threat increases interpersonal attraction only under conditions where the possibility exists of a cooperative solution to the common problem, then the latter condition could be identified as the source of reward.

Data supporting the cognitive dissonance hypothesis that A will like B if this enables A to reduce dissonant cognitions with respect to B are clearly negative with respect to a reinforcement position; under conditions where the cognitive dissonance hypothesis has been supported, B has been associated with objectively undesirable qualities or unpleasant experiences. Since there have been few dissonance studies explicitly concerned with interpersonal attraction, additional confirmation would seem advisable.

## Consequents of Liking: Empirical Generalizations

The investigations which are considered in this section may be roughly divided into the following types:

1. studies in which natural, existing groups are measured for the degree of interpersonal attraction among their members and scores on this measure are then related to some other variable;

2. studies in which groups, assumed to differ in level of liking among members (as for example, groups of friends and groups of strangers), or groups known to differ on some variable which is assumed to reflect interpersonal attraction, are compared on some other variable or dependent measure;

3. experiments in which interpersonal liking is explicitly manipulated through instructions or some other operation and its consequences for some dependent variable is subsequently ascertained;

4. experiments in which interpersonal liking is indirectly varied through the direct manipulation of some related condition and measures are then taken on a dependent variable.

Expression of aggression.

A will more freely express aggression or hostility under provocative conditions if he is in the presence of a liked B. In an early study, French (1941) observed groups of strangers and groups of team or club members in a frustrating situation in which the group attempted to solve insoluble problems. A variety of measures indicated greater expression of interpersonal aggression within the "organized" than within the stranger groups, without major disruption of group functioning.

Similarly, Wright (1943) found that pairs of children who were strong friends expressed more aggression toward the experimenter than did pairs of weak friends when they were subjected to frustration. Pepitone and Reichling (1955) used instructions to create high and low cohesive groups. The instructions informed members of the former that they would make "an exceptional team" since they were well matched, compatible and would get along well; opposite expectations were presented to members of low cohesive groups. Following provocation by a rude and insulting assistant, high cohesive pairs were found to express greater hostility than low cohesive pairs.

It has been suggested by Berkowitz (1958) that liking among group members has the effect of lowering inhibitions with regard to aggressive behavior. He has shown, however, in two investigations (Berkowitz and Holmes, 1960; Berkowitz and Green, 1962) that under conditions where aggression is displaced onto a person other than the instigator, generalization of aggression will vary positively with the degree of dislike of the person. In the first mentioned study, subjects who had been frustrated and insulted by the experimenter administered more shocks to disliked than to liked partners. In the second experiment, subjects subjected to similar treatment evaluated disliked partners on an adjective check list more unfavorably than they evaluated liked partners. Is it the case that a person will more freely direct hostility to the source of his frustration, i.e., to an outside instigator, when he is in the presence of others whom he likes, but that he will tend not to displace aggression onto liked persons when disliked persons are as readily available? There is a need here for additional research.

Self-evaluation.

A will change his evaluation of himself in the direction of achieving congruence with the evaluation made of him by a liked B. Manis (1955) has shown that, over time, there is a greater increase in agreement between the self-concepts of a sample of male freshmen and their friends' perceptions of them, than between self-concepts and their non-friends perceptions of them. Two studies (Videbeck, 1960; Maehr, Mensing, and Nafzger, 1962) varied the evaluation made of subjects' performances by "experts". Assuming a tendency to be positively attracted to an expert, the results of these investigations may be considered relevant here: self concepts were found to be positively influenced by both approval and disapproval.

Negative evidence has recently been reported by Pilisuk (1962). Subjects tended to retain favorable estimates of their own performance in the face of adverse criticism, whether the criticism came from a friend or from a stranger. When the criticism was alleged to have come from a friend, however, the subjects made use of a wide range of rationalizations to explain their friends' behavior. Harvey, Kelley, and Shapiro (1957) and Harvey (1962) exposed subjects to gradations of fictitiously negative information about themselves and found, similarly, that whether this information came from a friend or stranger made no significant difference in subsequent self-ratings. Subjects in the latter investigation, however, attempted to explain friends' derogatory evaluations differently from strangers' and tended to reevaluate friends more negatively than they reevaluated strangers who had rated them unfavorably. In the earlier study (Harvey, et al, 1957), on the other hand, it was found that strangers who had made negative evaluations tended to be subsequently devalued whereas distortions were made of the negative ratings themselves when these presumably came from friends. The evidence suggests that criticism by a friend does not invariably lead to changes in self-evaluation. Whether negative evaluation leads to greater attempts at rationalization, or devaluation of the source, or the use of different distorting mechanisms, when the source of the criticism is a friend in contrast to a non-friend, is not clear.

A will change his evaluation of himself so that it is congruent with his evaluation of a liked B. Kipnis (1961) compared self-evaluations of male freshmen with their evaluations of others and found that the subjects tended to describe themselves, after a six week period, in the same way that they had previously described their best friends. Subjects who had ascribed relatively "good" traits to their best friends, as compared with themselves, changed their self-evaluations in a favorable direction and those who had ascribed "poor" traits to their best friends changed their self-descriptions in a negative direction.

A's evaluation of his own performance or ability will be influenced by the level of performance or ability of a liked B. Support for this generalization can be found in data reported by Rasmussen and Zander (1954) from a field study of secondary school teachers. Those who evaluated their own teaching performance in a manner which deviated from their perception of the standards of their subgroup made higher failure scores the more they were attracted to the group. Failure was defined in terms of the discrepancy between own performance and ideal performance. Festinger, Torrey, and Willerman (1954) varied the scores made by group members on an experimental task and obtained support for their hypothesis that the "stronger the attraction of members to a group, the stronger will be the feelings of inadequacy on the part of those scoring less well than others and the stronger . . . [the] feeling of adequacy on the part of those scoring as well or better. . ."

An experiment by Stotland and Hillmer (1962) has shown that identification is not necessarily related to attraction. Subjects who read that another person had been good at a clerical task evaluated their own performances on the same task more favorably than did subjects who read that the other person had done poorly. This effect was reported to be independent of level of attraction to the model, although there was an overall preference for the "good" over the "poor" model on a "desire to converse with" question.

Our propositions regarding the effect of attraction to others on self-evaluation are supported only equivocally by the data reviewed above. Again, additional research is needed.

Evaluation of the situation.

A will respond more favorably to a particular situation if he is in it with a liked B. Marquis, Guetzkow, and Heyns (1951) have reported, from a field study of decision making conferences, significant positive correlations between a cohesiveness index and members' satisfaction with the group process and with the meeting. The cohesiveness index included observer ratings of liking among group members. Jordan (1953), in an investigation designed to test Heider's balance hypothesis, found that where two persons were described to subjects as liking one another, the situation which the hypothetical persons were in was rated as more pleasant than when the two persons were described as not liking each other. The relationship between persons had the most weight in influencing judgments of the situation, more weight than balance or imbalance in terms of agreement or disagreement between the two persons with regard to some object.

In a study by Exline (1957), subjects who had been told that they were in groups with well-matched, congenial others expressed greater satisfaction with their group's progress than subjects given the opposite orientation toward their fellow group members. Similarly, Libo had shown earlier (1953) that subjects told they were to work on a volunteered-for task with congenial group members differed significantly from subjects given the opposite instructions in their desire to stay with the group. Libo has also reported (1957) a significant relationship between the attraction of patients to their therapists, following their first interaction, and whether or not the patients returned for a second visit one week later.

Evaluation of others.

If A likes B he will tend to perceive B as similar to himself in attitudes, values and/or personality traits. A large number of investigations have provided evidence in support of this proposition. The well known early study by Fiedler, Warrington, and Blaisdell (1952) confirmed the hypothesis that subjects will perceive fellow group members whom they like best as more similar to themselves (and their ideal selves) in personality than those whom they like least. Corroborating data have subsequently come from samples of basketball and surveying teams (Fiedler, 1954), college freshmen (Kipnis, 1961), and sorority girls (Backman and Secord, 1962). Lundy, Katkovsky, Cromwell, and Shoemaker (1955) have also reported that personality descriptions of positive sociometric choices tend to be more similar to subjects' acceptable than to their unacceptable self-descriptions while the reverse is the case for descriptions of negative sociometric choices. In a quite different research context, the investigation of marital conflict, happily married persons have been found to differ from unhappily married ones in attributing greater trait similarity to their spouses (Preston, Peltz, Mudd, and Froscher, 1952).

The same tendency to perceive preferred persons as being like oneself has been reported with respect to values and attitudes. Precker (1953) found that students attributed to their chosen advisers ratings of evaluative criteria which were similar to their own; and Davitz (1955) found that children at a summer camp tended to perceive their most preferred peers as liking the same camp activities that they did. Byrne and Wong (1962) obtained data indicating that highly prejudiced white subjects assumed greater attitude dissimilarity between themselves and an unknown Negro than between themselves and an unknown white person while white persons low in prejudice assumed the same degree of similarity with a Negro as with a white stranger. It has also been shown, among groups of Navy personnel, that persons tend to assume that individuals whom they like also like each other (Kogan and Tagiuri, 1958).

A number of other studies appear relevant here, although liking is not explicitly varied. Bieri (1953), for example, had some pairs of subjects discuss together and agree on conclusions about common experiences and preferred activities; control subjects wrote on these topics individually, back-to-back. Predictions about partners' responses to the Rosenzweig Picture Frustration test were made before and after interaction. On the latter occasion, significantly greater similarity was found for the experimental subjects between their own responses and the responses which they predicted for their partners. In another investigation (Rosenbaum, 1959), subject pairs who had worked together cooperatively were reported to have subsequently assumed greater similarity with each other on personality traits than subjects who had worked competitively. Two studies (Smith, 1958; Stotland, Zander, and Natsoulas, 1961) have demonstrated that persons who are made aware of some similarity between themselves and another tend to perceive additional similarity.

Negative evidence has been provided by Lundy (1959). Subjects discussed a topic for five minutes, first with one student, then with another. During one of the interactions, subjects were led to believe that their partners had selected them for the discussion while during the other, subjects were led to believe the opposite. Assumption of similarity with one's partner (on the Allport-Vernon value scales) was found to be a function of order of interaction (greater on the second interaction) but not to be associated with the acceptance-rejection variable.

If A likes B he will tend to make favorable judgments of B's behavior. Horowitz, Lyons, and Perlmutter (1951) reported that in a face-to-face discussion group agreement by group members with one another's acts was directly related to whether the "actors" were liked or disliked. This finding emerged only from questionnaire data, however, not from the verbal record obtained during actual discussion. In a different kind of situation, a summer camp for boys, it was found that the performance of high status boys on an athletic task tended to be overestimated by their peers, while the performance of low status boys was underestimated (Sherif, White, and Harvey, 1955). Variations in judgments of performance were not significantly related to actual skill displayed on the task.

Two studies by Berkowitz (1956; 1957) provide additional evidence in support of the present generalization. High liking within effective air crews was found, in the first investigation, to be accompanied by members' perceptions of high motivation in one another. In the second investigation, utilizing simulated groups, high liking between partners (manipulated by means of instructions with regard to probable congeniality of one's fellow members) was accompanied by high regard for one another's opinions.

If A likes B, his sensitivity or accuracy in perceiving B's feelings, attitudes or behavior is increased. Suchman (1956) has reported, from a study of three five-person student groups, that "people who showed more favorability toward others were more accurate in estimating their feelings". Exline (1957), similarly, found that group members who were told that they were well matched and congenial were more accurate than members of non-congenial groups in perceiving the task-oriented behavior of their fellow members. Also somewhat relevant is a study by Schutz (1961) in which groups were composed so as to be homogeneous (compatible) with respect to members' interpersonal needs; after six meetings, group members were able to correctly identify the interpersonal characteristics of their group when the common characteristic of the members was expressed behavior rather than behavior desired from others.

*If A likes B he will perceive B as liking him.* Data supporting this proposition have been reported by Tagiuri and his coworkers from a variety of groups in different research settings (Tagiuri, Blake, and Bruner, 1953; Tagiuri, 1958; Tagiuri, Bruner, and Blake, 1958). The tendency toward "congruency", i.e., the tendency to assume that one's positive or negative feelings toward another are reciprocated is reported to be the most powerful relationship obtained and to be significantly greater than would be expected on the basis of chance (a robot model). "It is intriguing," wrote Tagiuri (1958), "to ask whether congruency is a tendency for people to feel chosen by those whom they choose, or contrariwise, to choose those by whom they feel chosen. Undoubtedly, there are individual differences in the order of this cycle." In general, however, Tagiuri argues for the dominance of the former tendency since individuals are usually *first* aware of their own feelings toward another. Data relevant to the perception of "reciprocated attraction" have also been reported and discussed by Newcomb (1956, 1958, 1960).

### Communication

*A will communicate more with a liked than a disliked B.* While findings which support this proposition have come from some investigations, the results of other studies have indicated that in situations where opinions differ, and where there is pressure toward uniformity, individuals tend to increase their communication to deviates; in some of these investigations measures have indicated that the deviates are disliked or rejected while in others this must be assumed.

Kelley (1950) found that a larger proportion of students took part in a class discussion led by a substitute teacher when they had been informed that the teacher was "warm" than when they had been given the opposite information. Back (1951) compared high with low cohesive pairs (manipulated by instructions) with respect to communication patterns in discussion of a story derived from pictures and found significantly more "withdrawal" patterns among the latter. Grossack (1954) has reported that more notes were exchanged by subjects under instructions to "cooperate" with fellow group members than by subjects instructed to "compete" on an experimental task. In still another relevant experiment, by Cervin (1956), the "solidarity" of three person groups was manipulated by having stooges agree or disagree with opinions expressed by the critical subject. Dependent measures indicated that both average degree of participation in discussion and response latency of critical subjects was greater in the "solidarity situation." Utilizing natural student groups, Lott and Lott (1961) obtained a significant positive correlation between cohesiveness, as measured by an index of interpersonal attraction, and median frequency of communication among group members on a discussion topic supplied by the investigators. Finally, Runkel (1962) has reported finding a relationship between the level of respect existing between secondary school teachers and how often they communicate with one another; the causal direction of this relationship, however, is not clear.

An investigation by Mellinger (1956) has provided interesting data not on frequency of communication but on the nature of communication as a function of interpersonal attraction. It was found that scientists in a research organization tended to conceal their attitudes about a particular issue when communicating with persons in whom they lacked trust.

In studies of small groups under pressure to achieve uniformity on a given question or problem, it has generally been found that communication tends to be directed more to deviants than to other group members, especially in relatively cohesive or homogeneous groups (Schachter, 1951; Festinger and Thibaut, 1951; Festinger, Gerard, Hymovitch, Kelley, and Raven, 1952; Emerson, 1954). More recently, Altman and McGinnies (1960) have reported that both heightened pace of discussion and frequency of opposition-directed remarks were positively related to members' valuations of their groups.

In the investigations cited in the foregoing paragraph, communication directed by group members to deviants consisted, primarily, of attempts to influence a change of opinion. It is probable, then, that the relationship between interpersonal liking and communication will vary with the conditions under which the interaction takes place.

Uniformity-conformity.

If A likes B he will tend to match his behavior to B's;

and he will try to influence B to behave as he does. Data relevant to this proposition have come from a sizable number of investigations. Most of the findings support a positive relationship between the degree of interpersonal attraction existing among persons and their consequent uniformity with regard to particular opinions, attitudes, judgments, or other behavior. Both attempts to influence, and successful influence by, liked persons have been shown. These two processes, which appear logically and empirically to operate together, are usually not separated, but some investigators have obtained measures of influence attempts as well as of resultant changes in behavior.

A study by Back (1951) is often cited in support of the hypothesis that pressures toward uniformity are greater in high than in low cohesive groups although Back's data provide only minimal support. Pairs of individuals worked on a story writing task under different instructions with regard to personal attraction, task direction, or group prestige, but whether the attempted variations in cohesiveness were successful is not clear. When both partners were taken into account, no significant difference was obtained between the high and low cohesive pairs on a measure of change following influence attempts, although in high cohesive groups there was reliably more change on the part of one partner.

The technique of manipulating group cohesiveness by telling subjects that they will probably like (find congenial) or not like one another has been used in a large number of investigations of the attraction-uniformity hypothesis. Festinger, Gerard, Hymovitch, Kelley, and Raven (1952) told members of some groups that they would find each other compatible, congenial, and interesting, and would most likely get along very well. Such groups were found to exert greater pressures for uniformity of member opinion with regard to a particular issue under discussion than groups given the opposite orientation. Similar instructions were used by Berkowitz (1957).in a study where subjects worked under simulated group conditions, and conformity to the responses of partners on a task was found to be significantly related to liking of the partners. In an earlier investigation Berkowitz (1954) had related intermember liking with the persistence of group productivity standards for an experimental task similar to one utilized by Schachter, Ellertson, McBride, and Gregory (1951). This latter study found that persons in high cohesive groups followed presumed member suggestions for low productivity to a significantly greater extent than did members of low cohesive groups, but when the pressure was for high production, cohesiveness made no difference.

Other research in which interpersonal liking has not been explicitly manipulated may be considered relevant to the present discussion if we assume variation in the level of attraction among subjects. Thus, for example, Bovard (1951a) found significantly more convergence, in perceptual judgments, among members of group-centered classes than among members of leader-centered ones. These two types of classes differed in amount of student interaction. Similarly, Festinger and Thibaut (1951) reported that among group members told that they were with others similar to themselves in interest in and knowledge about a given problem there was greater change in the direction of opinion uniformity than among group members given the opposite instructions. Homogeneity was associated with increased uniformity only for opinions on a football strategy problem, however, and not for those concerning treatment of a delinquent boy. In a study by Grossack (1954) some subjects were instructed to work competitively and others cooperatively. The findings provided support for the experimental hypothesis that cooperating individuals (assumed by Grossack to manifest a cohesive group structure) will make more attempts to influence others, and will accept more pressures in the direction of uniformity, than competing persons. Kidd and Campbell (1955) varied the success of groups on an anagrams task and found, subsequently, that subjects in "success" groups differed significantly from those in "failure" groups in conforming more to purported group averages regarding estimated light flickers. Finally, Dittes and Kelley (1956) have reported that group members who received ratings of average acceptability from their fellows tended to show more conformity behavior than those who received low or very high ratings.

Another group of studies have provided data on differences in conformity behavior between groups which more clearly differed in level of interpersonal attraction. Thrasher

(1954) investigated variations in perceptual judgment as a function both of gradations in stimulus structure and interpersonal relations. He found that the judgments of pairs of friends "were significantly more influenced by each other's judgments than the judgments of pairs of individuals who were not so positively involved (neutrals)." This was the case for stimuli of both intermediate and low structure value. From a quite different research setting, a field study of secondary school teachers, Rasmussen and Zander (1954) have reported that the discrepancy between perceived group standards (regarding teaching performance) and own ideal was smaller, the more attracted was a teacher to his group. From another field study, of decision-making conferences, it was concluded that the achievement of high consensus is associated with warm and friendly personal feelings among the participants (Guetzkow and Gyr, 1954). Thibaut and Strickland (1956) compared conformity behavior within groups of positively associated individuals (fraternity pledges) and within groups of strangers. Under varying pressure of believing oneself to be in the minority with regard to judgments, the greatest positive relationship between pressure and conformity was found to occur in those "pledge" groups which had been given a "group" as opposed to a "task" orientation. A more recent investigation by Zander, Natsoulas, and Thomas (1960) reported that subjects who were most attracted to their group were also ones whose own aspiration level (or personal goal), with regard to an experimental task, was highly congruent with the goal of their group. In an investigation of natural student groups, Lott and Lott (1961) obtained a significant relationship between the degree of mutual positive attitudes existing among group members and their conformity to a purported group standard with respect to an opinion question.

One experimental approach to the question of uniformity pressures and group cohesiveness, or intermember attraction, has been the demonstration of less tolerance for or greater rejection of deviates in high cohesive groups. Schachter (1951) obtained data supporting this hypothesis in a study where cohesiveness was manipulated through the use of differential instructions and stooges expressed points of view at variance with majority opinion. Generally positive but not definitive findings were also obtained from replications of this study by Emerson (1954) and by Schachter, Nuttin, De Monchaux, Maucorps, Osmer, Duijker, Rommetveit, and Israel (1954). Similarly, Festinger, Schachter, and Back (1950), who studied two parts of a student housing project, reported that in one there was a high, significant, negative correlation between a sociometric measure of cohesiveness and the percentage of deviates (with respect to a particular issue) in residence courts, and that deviates in these courts tended to receive fewer sociometric choices than those who shared the majority opinion. In the other portion of the project, however, neither of these findings was obtained.

Still another empirical variation has been the demonstration that individuals are more resistant to changing their opinions if these are shared by members of groups to which they are attracted. Gerard (1954), for example, reported that a paid participant who challenged the opinions of subjects, each of whom represented a group, was more effective in influencing those who were less attracted to their fellow group members. In an earlier investigation, Kelley and Volkart (1952) had obtained similar data from a natural setting. A sample of Boy Scouts heard a speaker criticize the Scouts' emphasis on camping and woodcraft. In general, those boys who valued their Scout troop membership least changed most in the direction of negative attitudes toward these activities.

We have classed together a group of studies in which influencer (model) and influencee (imitator) are distinct and clearly identifiable. Taken together, the results of these investigations provide considerable support for the proposition that an individual will tend to match his behavior to that of a liked other. In a laboratory study, Grosser, Polansky, and Lippitt (1951) had pairs of boys work together on block-designs. One of the boys, an experimental collaborator, varied his behavior with different partners so as to produce the conditions of high and low friendliness. Under the former condition as compared with the latter, there was more imitation by the subjects of certain aspects of the collaborator's behavior during rest periods. Lippitt, Polansky and Rosen (1952) have also reported, from a field study at a children's camp which replicated earlier research, that the boys investigated were more likely to imitate the behavior of those to whom they attributed high power, and that attributed power choices were highly related to judgments of personal liking. Harvey and Consalvi (1960) had groups of boys from a school for delinquents participate in a perceptual judgment task and found, in general, that the higher a boy's status (i.e., the more preferred he was as a teammate or team captain), "the greater his proportionate influence on members' judgments. . . ." Another investigation of children at a summer camp (Cohn, Yee, and Brown, 1961) obtained measures of food and activity preferences and of interpersonal attraction. Over a four week period, a significant change in preferences was found in the direction of similarity with most liked peers. In addition, a high degree of correspondence was noted between actual eating behavior at meal time and measured attitude changes. Change in one's self-evaluation so as to match the characteristics perceived in one's best friend has also been reported, among a sample of male college freshmen (Kipnis, 1961).

Some studies have shown imitation of a stranger, or presumed previously neutral individual, under conditions designed to increase his attractiveness. For example, in one investigation (Kelley and Woodruff, 1956) college students listened to a recorded speech which advocated opinions contrary to the norms of their college. Some were told that the audience heard applauding the speaker consisted of faculty and alumni from the college; others were informed that the applauding audience was made up of anonymous outsiders. More opinion change in the direction advocated by the speaker took place under the former than under the latter condition. Burdick and Burnes (1958) manipulated another variable and found that a lecturer, after speaking pleasantly for an hour to a group of students, was effective in changing their opinions, while after speaking unpleasantly on a later occasion, he was significantly less liked than previously and students' opinions tended to change in a direction opposite to his. (In the same paper Burdick and Burnes reported finding a positive relationship between emotionality, as measured by the Galvanic Skin Response, and disagreement with a liked experimenter.) Burnstein, Stotland, and Zander (1961) have reported that grade school children tended to model their preferences regarding deep sea diving more after an adult described as highly similar to them in background and other attributes than after a less similar adult. Under conditions where subjects were not informed about the adult's degree of similarity to themselves but were told about his sea diving ability, preferences of the model were more accepted by the children as their own when he was described as capable than when he was described otherwise. Suggestive data have been reported by McDavid (1959) from a study of imitation among preschool children: a female model was found to be initially more effective in providing behavioral cues than was a male model. Another and more recent investigation of nursery school children (Bandura and Huston, 1961) varied the behavior of the female experimenter so that some of the children experienced two warm and nurturant play sessions while the others experienced two cold, non-nurturant ones. There was more imitation of the experimenter's verbal and motor behavior by children in the former condition (except for aggressive behavior which was readily imitated by all subjects).

Although the empirical evidence favoring a positive relationship between interpersonal attraction and consequent behavior similarity is extremely impressive, there have been negative findings as well. Bovard, who had reported a positive relationship between interaction and convergence on perceptual judgments in one study (1951a), found in a later one (1953) that conformity on another perceptual judgment task was not reliably related to a measure of the average attraction of group members to their group. McKeachie (1954) compared group-centered with leader-centered classes and obtained equivocal results with respect to congruence between individual attitudes and perceived and actual group norms. Downing (1958) has reported failure to obtain a significant difference in level of conformity between members of high and low cohesive groups in an autokinetic response situation.

In a comparison among industrial work groups differing in cohesiveness, Seashore (1954) found that high and low groups did not differ reliably in within group variance with respect to member's judgments about a reasonable production level but the within group variance in high cohesive groups was significantly less than in low groups with respect to actual production. Burdick, too (cf. Walker and Heyns, 1962, pp. 30-40), has reported both negative and positive findings under different conditions. High liking for other group members was found to be positively related to non-conforming behavior in one experiment, and to conforming behavior in a second experiment. In the latter case, "conformity was made instrumental to being liked by other persons . . . by adding to the instructions the point that it is common knowledge that persons tend to like one another more, to get along better, when they agree about common problems."

Task performance

The effectiveness of A's performance on a task will be enhanced by working with a liked B. As was the case with respect to the last proposition considered, regarding uniformity of behavior, there exists an extensive literature devoted to the relationship between interpersonal attraction and productivity.

One experimental technique has simply compared groups of friends (or positive sociometric choices) with groups of non-friends on some measure of productivity. An early study by Husband (1940) found superior performance by pairs of sixth and seventh grade friends on word puzzles, jigsaw puzzles, and arithmetic problems. At three summer camps in which work-groups were formed according to choices made, so that congeniality was maximized, "Observers reported a superior solidarity over former camps as reflected in such indices as greater participation in discussions . . . and more work accomplished" (Faunce and Beegle, 1948). Van Zelst (1952a, b), experimenting in a natural work situation, grouped some carpenters and bricklayers into mutual-choice pairs and found that they excelled over control pairs on such indices as savings in labor costs and materials, rate of turnover, and job satisfaction. A more recent laboratory investigation (Bjerstedt, 1961), found that groups of children composed of chosen workmates surpassed groups composed of non-chosen children on story-telling tasks; they made higher scores on indices of interest in the quality of performance (process time and amount of rehearsal) and they achieved better results.

Other studies have obtained correlations between measures of interpersonal attraction and performance on some particular task. Goodacre (1951, 1953), for example, reported significant positive correlations between various indices of group cohesiveness and the scores made by combat and rifle squads on field problems. Similarly, Berkowitz (1956) has reported a significant relationship between aircrew members' attitudes toward one another and two criteria of their actual combat effectiveness; and Chapman and Campbell (1957), in a laboratory study, found that "Ratings of a person's desirability as a teammate correlate significantly with the success of the teams of which he is a member." Positive findings have also been reported by Darley, Gross, and Martin (1952) from a study of women's residence units, and by Gardner and Thompson (1956) from a study of fraternities.

Supportive findings may also be cited from investigations in which the independent variable may be assumed to reflect variation in interpersonal attraction; in some cases such variation has been shown, explicitly, to accompany the manipulation of conditions. For example, Sacks (1952) administered individual intelligence tests to three groups of nursery school children. The tester had previously established a "good" relationship with the children in one group, a "poor" relationship with the children in a second group, and she had had no prior contact at all with the remaining children. The scores of the children who were familiar with the tester were significantly higher than they had been ten days earlier on an alternate form of the test whereas this was not the case for the control children; moreover, the retest increases of the "good" relationship children were significantly greater than the increases of the "bad" relationship children. According to Sacks, qualitative observational data support the fact that the children differed in the intended way in their attitude toward the experimenter. In a study of a chain of supermarkets, Clark (cf. Homans, 1961, p. 255) obtained an almost perfect correlation between an index of social ease (status congruency of "bundler" and "ringer") and an index of labor efficiency. Cervin (1956) varied group "solidarity" by having two stooges reinforce or extinguish the opinions of the critical member of each group. The same subjects "showed better and more even performance" when in the solidarity than in the dissolidarity condition. The compatibility of groups, defined by similar inter-personal orientations among group members, was varied by Schutz (1955) and by Moos and Speisman

(1962). Data from both studies show a tendency toward better task performance by compatible groups. Schutz's results also indicated that the difference between compatible and incompatible groups varied with type of task. In an investigation by E. E. Smith (1957) group productivity was shown to be negatively affected by the presence of two silent members in five-person experimental groups; the silent members were perceived as being unpredictable.

That individuals who work together cooperatively are more productive on some criterion than group members who compete against one another has been demonstrated for classroom groups by Deutsch (1960) and by Smith, Madden, and Sobol (1957). Blau (1954), interested in the same variable, compared groups of employment agency interviewers and found, paradoxically, that competitiveness and productivity were "inversely related for groups but directly related for individuals in the competitive group." The competitive group was less productive than the group in which there were cooperative norms and in which competitive tendencies were curbed, but within the former group, the more competitive individuals were relatively more productive.

Not directly concerned with actual performance, but with individual aspiration levels for group achievement, is an investigation by Ex (1959). Subjects who worked with a sympathetic partner (a congenial confederate) were found to have higher levels of aspiration for their joint performance than subjects who worked with an unsympathetic partner.

Not all the empirical tests of the proposition under consideration have been positive. In an early study by Philp (1940) pairs of kindergarten children who preferred each other or were strangers worked on simple tasks. Although the "quality of the response made during the two types of pairings" was reported to be very different, there were no reliable differences in average performance or range of performance. In a far different setting, a field study of actual conferences, cohesive groups were found to be no more productive than less cohesive ones (Marquis, Guetzkow, and Heyns, 1951), and among industrial work groups, a tendency was found for either high or low production among high cohesive groups, depending upon the group's standard (Seashore, 1954). That high cohesive groups can be induced to lower production or perform poorly has been demonstrated in experiments by Schachter, Ellertson, McBride, and Gregory (1951) and by Berkowitz (1954).

Atthowe (1961), who measured the cohesiveness of decision-making pairs by their number of "we" versus "I" remarks, also found no relationship between this measure and task performance, while Adams (1953) has reported a curvilinear relationship between the degree of status congruence within bomber crews (which varied positively with friendship) and measures of their technical performance. It has also been suggested that under certain conditions there is a negative relationship between interpersonal liking and efficient task performance. According to Fiedler (1953), "quite in contrast to therapeutic and social relations, we find that psychological closeness and warmth in key members of small groups seems to be a detriment to effective team work . . ." under conditions where teams "want to get a job done." Similarly, Stogdill (1959, p. 269) has suggested that "the effort that is devoted to the development of integration might be conceived as a subtraction from the efforts that are devoted to productivity." Supporting data may be found in investigations of machine operators in a shoe factory (Horsfall and Arensberg, 1949), of surveyor teams (Fiedler, 1954), and of rifle teams (McGrath, 1962). Hoffman (1959) and Hoffman and Maier (1961) have varied the homogeneity of members' personalities in problem solving groups and found that nonhomogeneous groups tended to produce superior and more inventive solutions. In these studies data on intermember liking were not obtained.

Equivocal results have been reported by Yuker (1955) who used group recall as a measure of group productivity. In an interesting experiment, the leadership (democratic versus authoritarian) and cooperation-competition dimensions of groups were varied and individuals recalled alone and collectively a story which had been read to them while they were assembled in their four-person groups. The difference in accuracy between group recall and initial individual recall was found to be significantly greater in cooperative than in competitive groups, but there was no difference between democratic and authoritarian groups, and neither the cooperation-competition nor the leadership variable was found to affect differences in accuracy between final individual recall and initial individual recall. Yuker's data, however, suggest that his groups did not differ reliably in cohesiveness. In a subsidiary analysis, Yuker found that the ten groups in which there had been the greatest improvement from initial to final recall differed from the ten groups in which there had been the least improvement on three questionnaire items reflecting cohesiveness.

### Learning

A will learn faster in the presence of a liked B. We are not concerned here with the question of whether learning in a group situation is superior to learning when alone, a question discussed often in the earlier literature (cf. Lorge, Fox, Davitz, and Brenner, 1958) and more recently by Gurnee (1962). Our interest is rather in those investigations which compare groups differing in the level of attraction among members or in some related variable. Such studies have been conducted in a variety of learning situations and have yielded generally equivocal results.

The major independent variable in studies by Perkins (1950) and Rehage (1951) was group versus leader centered classroom climates. In the former, positive results were obtained with respect to the learning of child development material by in-service teachers; in the latter, eighth grade students under the "teacher-pupil planning" condition were found not to differ significantly from those under the "teacher planning" condition in the "amount of social studies subject matter learned." Calvin, Hoffman, and Harden (1957) investigated the effect of climate (permissive, democratic versus non-permissive, authoritarian) on group problem solving. The trends in three experiments supported their hypothesis that a permissive climate is superior to a traditional one for subjects with high intelligence but a handicap for subjects with only average intelligence.

In a recent investigation by Shaw and Shaw (1962) the sociometric composition of three-member groups of second grade children was varied. The children, in their groups, studied lists of spelling words and were tested during both an early and late period of interaction. Spelling scores were found to be positively correlated with an index of group cohesiveness, or intermember liking, only on the first test; they were unrelated on the second test.

A number of relevant studies have been concerned with verbal conditioning as a function of the relationship between experimenter and subject, or simply the attractiveness of the experimenter. Binder, McConnell, and Sjoholm (1957) found a higher rate of learning (for "mildly hostile" words) by subjects whose reinforcements were provided by an attractive, soft-spoken young lady than by subjects reinforced by a very masculine, former marine captain. No data were provided on the subjects' attitudes toward the two experimenters. On the other hand, negative findings have been reported by Kanfer and Karas (1959). Prior to the conditioning of "we" or "I" some subjects had been tested by the experimenter and told that they did well, or poorly, or told nothing, while some subjects were given no prior experience with the experimenter. Those subjects who had interacted with the experimenter conditioned significantly better than those in the no-experience group but there were no reliable differences among the former in rate of conditioning or final response level. Although questionnaire results indicated that the "failure" subjects considered the experimenter to be unfriendly and a source of discomfort, these subjects also said that they were more highly motivated on the conditioning task. Using a similar design, Simkins (1961) obtained similar results. Hostile words were reinforced after subjects had had prior experience with the experimenter. When the reinforcement consisted of the experimenter's saying "good" or "that's fine", the "failure" subjects (i.e., those previously criticized by the experimenter) conditioned better than any other group of subjects; when points or pennies were used as reinforcers, conditioning was not related to the experimenter's prior behavior.

Weiss, Krasner, and Ullman (1960) also varied the experimenter's behavior to induce a hostile or a positive atmosphere prior to a critical series of conditioning trials. The hostile condition served to decrease responsiveness but did not affect reconditioning. Quite similar findings were reported by Reece and Whitman (1962). In this study the experimenter varied his expressive movements _during_ the conditioning procedure and successfully induced perceptions of "warmth" and "coldness" by different subjects. Those under the "warmth" condition produced significantly more words, but the number of plural nouns (which were reinforced) was not affected.

Still another kind of manipulation was employed by Sapolsky (1960). Some subjects were told that they would be working with a congenial experimenter while others were given the opposite instructions. A measure of the success of the manipulation yielded positive findings and response acquisition was found to be significantly greater for high than for low attraction subjects. In a second study, Sapolsky varied the "compatibility" of subject-experimenter pairs by selecting them on the basis of scores on Schutz's FIRO-B Scale, and again obtained positive results. These data provide the clearest support for the proposition under consideration.

We must cite, finally, some unique findings reported by Horwitz (1958) who has conducted a series of investigations on the effects of the *veridicality* of one's expressions of like or dislike. In one study, a teacher deferred to students' desires under one condition and was, therefore, power-*enhancing* with respect to the students while in another condition the teacher was power-*reducing* and always acted upon his own desires. These manipulations, designed to produce liking or disliking of the teacher, had proved successful in previous investigations. Then, by manipulating information about group attitudes toward the teacher, either a veridical or non-veridical group norm was developed. Subsequently, on a type-setting task, the number of trials required to achieve two consecutive perfect performances was found to be significantly lower (i.e., faster learning occurred) under the veridical than the non-veridical condition. In other words, whether the students liked or disliked the teacher did not matter so long as the group norm was the same as the attitudes which were generated by the experimental manipulation of the teacher's behavior.

## Overview

Compared with the empirical findings regarding the antecedents of liking, those relevant to consequences are far less clearcut and definitive. This is reflected in the relative lack of theoretical concern with the effects of attraction, as we shall see below. Since applications of so-called group behavior principles are often urged in such fields as group psychotherapy, education, and community relations, it is vital to distinguish between validated and unvalidated hypotheses, or to differentiate between principles which have been relatively well substantiated by research and those for which the empirical evidence is weak or contradictory. In the former category might be placed generalizations concerning the effect of interpersonal attraction on evaluation of the situation, on evaluation or perception of persons who are liked, and on uniformity of behavior or opinions on certain issues, perhaps those that are most relevant to the personal relationship. Propositions linking interpersonal liking with the expression of aggression, self-evaluation, communication, task performance and learning require additional empirical attention and refinement.. In need of systematic coordination within some general framework are all of the generalizations which we have considered here.

## Consequents of Liking: Theoretical Expectations

It is surprising to find that so little has been written of a systematic nature, regarding the predictable effects of liking between individuals or among members of a group. Furthermore, in much of what has been written, it is difficult to identify underlying general principles; the predictions seem, for the most part, to be more in the form of empirical generalizations and, consequently, one theoretical position can not easily be distinguished from another. There are exceptions and some attempts at genuine derivation from sets of limited, broader principles.

### Festinger

Festinger has not been concerned with interpersonal attraction, per se, but with a number of related social phenomena. He predicted, for example (1950a), that as forces to remain within a group increase (i.e., as the group's attractiveness increases), pressures to communicate will also increase. Social communication, according to Festinger, is a means by which individuals compare their opinions with one another (thereby validating them against the standard of social reality), and is a means by which individuals may more effectively progress toward a group goal. Both of these communication-provoking needs (or forces) are presumably greater in high cohesive or more attractive groups. Elsewhere (1954) Festinger more explicitly hypothesized that the greater the attractiveness of a group, the more important it is as a standard of comparison with respect to abilities and opinions. Further, the amount of opinion change on the part of an individual is a function of the forces acting on him to remain in the group, or, in other words, is a function of the attractiveness of the group, its members, or activities.

### Heider

On the basis of the balance concept which underlies his predictions of interpersonal behavior, Heider has proposed (1958) that when one person likes another, the following consequences will be probable: increased similarity between the two persons with respect to their attitudes toward objects, events, or other persons, resulting from changes in the liker, changes in his perception of the object of his liking, or both; the liked person will be approached or contacted and the liked person will be benefited or helped and will be perceived as benefiting the liker.

### Newcomb

In Newcomb's theoretical papers (especially 1953) can be found considerable explicit discussion of the effects of interpersonal liking. His "strain toward symmetry" proposition leads to the prediction that the greater the valence of one person (B) for another (A), or "the more intense one person's concern for another," the greater is the likelihood that A will be sensitive to B's "orientations to objects in the environment," and that symmetry of orientations will be achieved. Perceived symmetry, as well as the achievement of objective symmetry, will vary as a function both of "intensity of attitude toward X and of attraction toward B."

An important refinement in Newcomb's position is represented by his hypothesis that there will be a greater range of subjects or issues "with regard to which there is strain toward symmetry" between persons more attracted to one another than between persons less so, and for the latter "strain toward symmetry is limited to those particular Xs, co-orientation toward which is required by the conditions of association." In a later paper (1960) Newcomb proposed, in addition, that A will tend to endow B with "favorable attributes" if A is positively attracted or has a favorable attitude toward B.

### Thibaut and Kelley

These theorists (1959) are concerned primarily with the consequences of one person's dependence upon another, rather than with one person's attraction to another. Although dependence and attraction are seen as tending to be positively correlated, the concepts are independently defined and related to other variables. High cohesiveness, for example, is said to result from a condition of high interdependence among group members, a condition in which each member has high power over the other, or "can move the other through a relatively great number of reward-cost units above" the other's comparison level based on alternative group relationships. It follows, then, that in "high cohesiveness both the ability to make demands and the ability to resist them are greater than in low cohesiveness," producing a potentiality for conflict under the former condition. Cohesive groups, however, quickly find a procedure to avoid conflict: one member will have more power than others, or the members define a range of issues on which conformity is expected. When members have power over one another, this means that they have the ability to reward each other; this ability "seems to create further ability to do so . . . A will reward B in order to get B to produce behavior that he, A, finds rewarding. By so doing, A creates conditions under which, through association learning, B is likely to learn to like this behavior himself. The greater A's ability to reward B, the more this learning will occur." In this way, members of cohesive groups move toward similarity in values, attitudes, and behavior.

### Lott and Lott

With positive attitudes among persons defined in learning theory terms as anticipatory goal responses having cue and drive properties, Lott (1961) has predicted consequences for group behavior derived from the Hullian framework. Since attitudes have drive value, the greater the degree of intermember liking, the higher should be the general level of group activity, the quantity (not necessarily the quality) of task production, and the level of communication. Similarly based on the assumed drive value of attitudes is the prediction that more efficient learning should take place in high than in low cohesive groups, or on the part of individuals who are in the presence of liked others.

It is also predicted that the "more cohesive the group the greater the probability that members will develop uniform opinions and other behaviors with respect to matters of consequence to the group." This hypothesis stems from the fact that stimuli which evoke anticipatory responses are thus able to function as secondary reinforcers since this property of a stimulus depends upon the stimulus being able to evoke an anticipation of reward. Persons who are liked, in other words, are sources of secondary reward. It can, therefore, be expected that the greater the interpersonal attraction among persons, the greater is their reinforcing potential, and the greater will be "the probability of uniformity among them on issues where deviancy is accompanied by withdrawal of group members from the deviant." Thus, uniformity is not always expected with respect to all issues. Lott and Lott have suggested further (1961) that a positive relationship between cohesiveness and conformity can be predicted "only in those situations where the stimulus features are similar, to some degree, to those which were present when group members acquired their secondary reinforcing characteristics. The principle of stimulus generalization, in other words, should be employed to predict the effectiveness with which group members can act as secondary reinforcers for one another in diverse situations."

## Some General Considerations

A number of years ago Albert (1953) raised provocative questions regarding the concept of group cohesiveness. He discussed the generality of its conceptual definition and the diverse and questionable attempts to operationalize it, and asked, "is cohesiveness necessary?" We believe that at the present stage of development within the area of group behavior, we would do better to investigate more clearly definable factors, such as interpersonal attraction, establishing relationships with antecedent and consequent variables. We have attempted here a beginning in this direction. Cartwright and Zander (1960) have suggested a similar approach. "The most important task for group dynamics," they pointed out, ". . . is to establish a generally accepted set of basic variables and concepts having clear empirical and conceptual meaning . . . One part of the problem is to isolate the actual unitary variables or dimensions that make discernible differences . . . The differentiation of unitary variables can only be accomplished by empirical work which discovers what regularities are invariably found among measurements and observations" (p. 46f.).

We do not intend to throw out group concepts and to substitute for them concepts definable in terms of the behavior of individuals, but we believe it to be both more parsimonious and systematic to begin with the latter, our only source of data, after all. Motivation for group membership resides in the individual, and the consequences of group processes are seen in changes in individual behavior. Our thinking although primarily influenced by modern learning theory, is in accord with other contemporary positions within social psychology. Homans (1961), for example, maintains that "from the laws of individual behavior . . . follow the laws of social behavior when the complications of mutual reinforcement are taken into account" (p. 30). Floyd Allport's theoretical orientation is similar (1962): "When the group dynamicist speaks of the 'attraction of the group for the individual' does he not mean just the attraction of the individuals for one another? If individuals are all drawn toward one another, are they not *ipso facto* drawn to the group?" Allport has refined his early theoretical position which saw the explanation of social phenomena "*only in the psychology of the individual as he operated in situations with others*" to a view of groups as collective "structures" of articulated behaviors engaged in by interacting persons. In other words, what constitutes a group are "*particular give-and-take behaviors*."

A decade has passed since Riecken and Homans' excellent review of literature relevant to the "psychological aspects of social structure" (1954), but the need for codification of research findings, which they emphasized, is still a pressing one. Our aim, too, has been to place investigations under a "rationally ordered set of headings, and to state the findings in the smallest number of independent hypotheses." We also share with Riecken and Homans the assumption that "there are no such things as contradictory findings," that such findings must have been reached in different circumstances, and that the search to identify the specific characteristics of these circumstances "is one of the most potent sources of growth in knowledge."

## PROCEDURAL NOTE

The general experimental procedures to be described in this section of our report were carried out in the same sequential fashion for all groups involved. So that the reader may have an overview of this sequence and the time periods involved, an illustration will be presented using a single class group as an example. The experimental tasks will not be clear from the example. They are described in detail later. The illustration is given merely as a means of showing how the total experiment was carried out over time:

| | |
|---|---|
| Day 1 | Sociometric Test I |
| Day 3 | Basic Learning Task |
| Day 5 | Retention and Relearning Tasks; New Learning Task |
| Day 35 | Sociometric Test II |
| Day 37 | Persistence Task |
| Day 39 | Uniformity Task |
| Day 46 | Measure of Uniformity over Time |

The time period between the New Learning Task and Sociometric Test II actually varied from 30 to 35 days for the various classes. The general time schedule was closely adhered to with only slight deviations taking place in a very few instances.

The California Test of Mental Maturity was administered to all the children, in their respective classes by their own teachers, two to four weeks prior to Day 1 of the investigation, i.e., prior to Sociometric Test I.

# INDIVIDUAL LEARNING AS A FUNCTION OF COHESIVENESS

## Basic Learning Task: Method

### Subjects

Two hundred and six (206) fourth and fifth grade students served as subjects (Ss) on this task: 97 were boys and 109 were girls. They were selected from one fourth grade class and one fifth grade class in each of four different elementary schools on the basis of sociometric and IQ score considerations, discussed below. The Mean IQ of all the Ss is 109.61. (The Mean IQ is based on an N of 204 as two Ss were absent from class on the day tests were given and no other IQ scores were available for them.)

### Procedure

Two days prior to presentation of the learning task, potential Ss (i.e., all members of the class) were given a sociometric test in their classroom by their regular teacher. Each S rated all other same-sex children in the class on the following form (the example used is the boys' form):

☐ I like him very, very much.

☐ I like him. He's alright, but I like some other boys better.

☐ Sometimes I like him a little bit and sometimes I don't like him.

☐ Most of the time I don't like him.

☐ I never like him and don't think I ever will.

The instructions, read aloud by the teacher, were:

> I'd like all of you now to clear your desks and take out a pencil so that you can fill out a little booklet which I will pass out. When I hand you the booklet just leave it on your desk and do not open it until I tell you to. (Teacher hands out booklets.) All of you have now been given a Friendship Book. If you are a girl you will find the word "Girls" on the top page; if you are a boy you will see the word "Boys".
>
> Inside the book there are pages which look like this. (Teacher holds up large cardboard model of a page.) At the top of the page will be the name of a boy or a girl in this class. I want to know how you feel about this boy or girl, how much you like or don't like him or her. You have to pick one of the five sentences on the page which best describes how you feel. The first sentence says, "______________________________".
> The next, "______________________________".
> (Teacher reads all 5 sentences aloud.)
>
> You must pick only one sentence. With your pencil put a big "X" in the box in front of the sentence (Teacher demonstrates placing "X" next to each sentence while reading each one again. "If you pick ______________.) Remember, put only one "X" on a page in front of the sentence which best tells how you feel about the boy or girl whose name is at the top of the page.
>
> This is not a test and you will not be graded. I just want to know how you feel about the other children in the class. Be very honest. Are there any questions?
>
> You may now open your book and begin. When you finish, raise your hand and I'll collect your book.

The sociometric ratings were converted to a five-point scale ranging from point 5 "I like him very, very much," through point 3 "Sometimes I like him a little bit and sometimes I don't like him," to point 1 "I never like him and I don't think I ever will."

High cohesive and low cohesive same-sex groups of three or four children were formed on the basis of the sociometric data; i.e., Ss were placed in a particular group on the basis of their ratings of one another on the sociometric test. High cohesive groups were formed by putting together Ss whose mutual ratings were at the positive end of the scale; the low cohesive groups were composed of Ss who rated each other mutually at the negative end of the scale. A single score, indicating the cohesiveness level of a group, was calculated by the formula $\sum X/N\ (N-1)$ where $X$ = a rating and $N$ = the number of group members who rate each other. This formula takes into account the rating of each group member by every other member and is, thus, an operational measure of the conceptual definition of cohesiveness presented earlier. The range of cohesiveness scores for the 35 high cohesive groups which were formed was 5.0 to 4.2 (Mean = 4.59); for the 27 low cohesive groups the scores ranged from 3.3 to 2.2 (Mean = 2.91). It can be seen that it was easier to form high than low cohesive groups, in accord with our definition. All together 37 of the groups had three members and 25 had four members.

In addition to the sociometric ratings which they had made and received, the IQ of subjects was also taken into account in placing them in groups. The California Short-Form Test of Mental Maturity, Elementary Form, 1957 had been administered to all of the classes participating in the investigation several weeks earlier. This test yields a language and non-language, as well as a total IQ score. The latter was used to place children into high or low IQ groups. Some of the children had been absent when the IQ test was administered, and were placed into high or low IQ groups on a random basis. There were subsequently tested; five children made scores which were incompatible with those of others in their groups and their learning task data are therefore excluded from consideration. These children are not included in the N of 206. In placing children into high or low IQ groups (which were also either high or low in cohesiveness) the following general procedure was followed: a child with a score of 116 (1 S.D. above the Mean) or above was eligible for placement only in a high IQ group; a child with a score of 100 or below was eligible for placement only in a low group; those with scores between 115 and 101 could be placed in either high or low IQ groups but we avoided putting subjects into low groups if their IQ score was above 108 and we avoided putting subjects with scores below 108 into high groups. It must be kept in mind that subjects had to be placed in groups with other children of a compatible IQ level as well as with other children whom they rated highly and were highly rated by or whom they rated poorly and were poorly rated by. This was often a difficult procedure.

The actual range of individual IQ scores for children who were placed in high IQ groups is 143 to 107 (Mean = 120.79), and for children placed in low IQ groups, 118 to 72 (Mean = 98.21). (That an S with an IQ score of 107 was in a high IQ group, and an S with an IQ score of 118 was in a low IQ group stems from the fact that a very small number of children were not given the California Test of Mental Maturity until after the learning task data were analyzed.) The Mean IQ of any high

IQ group was 115 or above while the Mean IQ of a low IQ group was 114 or below. In Table 1 the four basic subject divisions are described in terms of cohesiveness, IQ score, number of small groups and total number of subjects.

On the basic learning test Ss first worked as a group in arranging and assembling the learning materials; they then studied the materials individually in the presence of one another; and finally took an individual test while still in the experimental group. The task involved learning Spanish equivalents of English words.

The experimenter (E) was first introduced to the Ss in their classroom by their teacher. After the introduction E said the following to the whole class:

> I am a psychologist; I work at U.K. I don't know if you know what psychologist means, but this is how you spell it and this is how you say it. It means that I am interested in studying people and especially how they learn things. I am working on a big project and have selected your class as one of eight in the city and county to help with my research. Your teacher and principal were kind enough to let me come here today.
>
> I am going to ask you to help me find out how easily children in your grade can learn words in a foreign language. I've divided your class up into small groups. I will call one group out at a time to come with me into the ______________ room and there I will explain exactly what I'd like you to do.
>
> I know that you will find it fun and I'm sure that I will enjoy myself, too.
>
> Let's start first with ________________________.

Experimental groups were called in a random, pre-determined order.

## Table 1

### Summary of Experimental Conditions for Basic Learning Task

| Condition | Mean Group Cohesiveness Index | Mean IQ | No. of groups | Total No. of Ss |
|---|---|---|---|---|
| High IQ - High cohesiveness (Hi I Hi Co) | 4.63 | 120.98 | 18 | 64 |
| High IQ - Low cohesiveness (Hi I Lo Co) | 2.97 | 120.46 | 12 | 39 |
| Low IQ - High cohesiveness (Lo I Hi Co) | 4.53 | 99.35 | 17 | 54 |
| Low IQ - Low cohesiveness (Lo I Lo Co) | 2.86 | 96.89 | 15 | 49 |
| | | Total | 62 | 206 |

In the experimental room the assistant (A) was introduced to the Ss and she distributed name tags. E and A also wore name tags. The task was introduced to the Ss by means of the following instructions:

> As I said in the class, I want to see how easily children in your grade can learn words in a foreign language. I am trying out a new method of teaching in which children work together in groups of 3 or 4 without the help of a teacher. Today we are going to see how well you can learn some words in Spanish. This is the language, as some of you already know, that is spoken by people in Spain and by people in some South American countries, like Mexico. By the way, do any of you know Spanish?
>
> Each (boy) (girl) in your group will get (three or four depending on group size) cards with pictures on them. Each of the cards will also have a Spanish sentence on it. The Spanish sentence describes the picture. Here is an example. Here's the picture (E points) and here's the Spanish sentence, four words which describe the picture, "Este es un sombrero."
>
> In the center of your table I will place a stack of smaller cards. These will not have pictures on them. Instead, each will have just an English sentence on it like this. Here you see (points) four English words, "This is a hat." These two cards (pointing) go together. They go together because the English words have the same meaning as the Spanish words. (E points to Spanish word and says English word.)
>
> Your job will be to match up each English card in this stack here with one of the Spanish picture cards. Remember, each (boy) (girl) in the group will get (three) (four) Spanish picture cards to hold. You can do the matching job best if each one of you in order will turn up an English card on the top of the stack, read the sentence out loud, and then see who has the Spanish picture card that goes with it. The (boy) (girl) who has the right Spanish picture card gets the matching English card. (He) (She) can then put the two cards together by putting the English card on the top under the paper clip like this. Then the Spanish sentence is on the bottom and the English sentence is right above it.
>
> When you have matched each Spanish picture card with the correct English one, let me know. Be sure not to make any mistakes and work as quickly as you can. Any questions? (E hands out cards.)

As the instructions indicate, Ss paired an English sentence with a Spanish sentence, using the picture on the

Spanish card as the key for the matching. There were twelve 6 1/4" x 5 1/8" Spanish cards, covered by plastic. The English cards, also plastic covered, were 5" x 2" and each could be fitted onto a Spanish card by sliding it under a paper clip on the top of the Spanish card. When the two cards were matched, the English sentence was at the top of the card and the Spanish equivalent was at the bottom. Thus an S looking at a card had both the English words and the Spanish words arranged adjacent to each other on the card in front of him. The experimental Assistant measured the amount of time it took each group to assemble the materials.

The Spanish and English sentences used are listed below.

| | | |
|---|---|---|
| 1. | Este es un vaso. | This is a glass. |
| 2. | Yo soy un hombre. | I am a man. |
| 3. | Esta es mi cabeza. | This is my head. |
| 4. | Esta es una mesa. | This is a table. |
| 5. | Esta es una pierna. | This is a leg. |
| 6. | Este es un pájaro. | This is a bird. |
| 7. | Esta es una ventana. | This is a window. |
| 8. | Yo soy una muchacha. | I am a girl. |
| 9. | Esta es una casa. | This is a house. |
| 10. | Este es un barco. | This is a boat. |
| 11. | Esta es una botella. | This is a bottle. |
| 12. | Esta es una puerta. | This is a door. |

After the group matching procedure, Ss were asked to study the cards and learn the English meanings of the Spanish words. The instructions were:

That's fine. That's very good (referring to the matching activities). The next step is for you to learn the meanings of the Spanish words so that when you see them alone you'll be able to tell what they mean in English. After you have studied for awhile I will give you a test. I will hold up a card like this with a Spanish word on it (sombrero) and you will write down on a piece of paper the correct English meaning, "hat."

You each now have (three) (four) pairs of cards that go together. Study your own pairs first. When Miss Briscoe rings this bell, pass your (three) (four) pairs to the (boy) (girl) on your right. Study these until the bell rings again, then pass your cards again to the (boy) (girl) on the right. We'll keep doing this until you've all had a chance to study all the matching cards twice. Then I'll collect the cards and give you the test. Remember, you are trying to learn the English meaning of as many Spanish words as you can. Study quietly and when the bell rings quickly pass all your cards to the (boy) (girl) on your right. Any questions?

On each "pass" S studied his set of cards for 1 1/2 or 2 minutes depending upon whether there were 4 or 3 Ss in the group (and, thus, whether there were 3 or 4 cards in each set). The study procedure was arrived at on the basis of pretesting. It was found that the children concentrated on the task more intently if they studied for short time periods than if they studied the same amount of time in larger concentrated blocks.

After 12 minutes of study the cards were collected and a mimeographed answer sheet with 15 spaces on it was given to each S, with the following instructions:

(E collects cards and distributes test papers)

I hope you are ready for the test. These papers are for your answers. You will notice that there are 15 spaces. I will hold up a Spanish word on a card (shows word "sombrero"). You write its English meaning on the paper. Will everybody now print his name clearly on the top of the sheet where it says "Name." To help you keep track of the words I will call out the number. If you do not know the English word, draw a line in that space so you won't get mixed up on the word numbers. If you think you

> know the word but are not sure of the spelling, spell it as best you can. Are you ready? Good luck!

Then E presented 15 Spanish words, one at a time, by holding each in front of the Ss. Each card was exposed for 15 seconds during which the Ss wrote the English meaning on their answer sheets. At the end of the 15 second time interval A rang the bell, E put down the card, called out the number of the next card and held it up for all group members to see. These steps were repeated until E had presented all 15 words. The following 15 Spanish words were used on the test.

1. vaso
2. cabeza
3. mesa
4. muchacha
5. es
6. casa
7. hombre
8. pajaro
9. barco
10. pierna
11. este
12. puerta
13. botella
14. ventana
15. yo

The Ss were then thanked for their cooperation and E told them he would be back in a few days and that he would tell them how they had done on the test.

## Retention, Relearning, and New Learning Tasks: Method

### Subjects

One hundred and fifty five (155) of the original 206 fourth and fifth grade students served as Ss in this portion of the experiment. The Mean IQ of these 155 children is 109.76. The male-female ratio is 71:84. Subject losses were accounted for by absences; in the case of three-person groups, the absence of one child eliminated the other two, whereas a four-person group became a three-person group if one child was not present on this second occasion. There were 30 three-person and 19 four-person groups. Table 2 summarizes the group cohesiveness scores, IQ scores, group and subject numbers of the four subject divisions tested in this portion of the experiment. The changes from Table 1 are due only to the absence of individual subjects and the consequent elimination of some groups. The cohesiveness indices of the Hi Co groups ranged from 5.0 to 4.0 (Mean = 4.58), those of the Lo Co groups ranged from 3.3 to 2.2 (Mean = 2.92). The individual IQ scores of subjects in the Hi I condition ranged from 147 to 107 (Mean = 121.12), and of those in the Lo I condition from 117 to 76 (Mean = 98.98).

Table 2

Summary of Experimental Conditions for Retention, Relearning, and New Learning Tasks

| Condition | Mean Group Cohesiveness Index | Mean IQ | No. of groups | Total No. of Ss |
|---|---|---|---|---|
| Hi I Hi Co | 4.62 | 121.21 | 14 | 47 |
| Hi I Lo Co | 2.93 | 120.96 | 10 | 28 |
| Lo I Hi Co | 4.53 | 99.32 | 15 | 47 |
| Lo I Lo Co | 2.91 | 98.47 | 10 | 33 |
| | | Total | 49 | 155 |

Procedure

One week after the Basic Learning Task, E and A returned to the school. Before the experiment was begun, on this occasion, E reported to the class that they had all done well on the test the week before. No individual scores were given nor was anything other than this general statement made with regard to the test performance of the previous week. The first group was then called to the experimental room.

After A pinned name tags on the *Ss*, E read the following instructions.

> I want to see how well you remember some of the words you learned on ____________. I'm going to give each (boy) (girl) an envelope. Print your name on it carefully. Here is a booklet with 10 pages. You will notice that each page is numbered in the upper right hand corner here. The numbers go from 1 to 10.
>
> What we'll do is this: I'll hold up a card with a Spanish word on it like this (sombrero); you write down the English word on the first page if you know the English meaning. If not, draw a line on that page and go on to the next page and wait for the next word. I'll give you 10 seconds to write your answer. At the end of 10 seconds the bell will ring and I'll turn the card over so that you can see what the correct English word is, like this (hat). When the bell rings turn to the next page in your booklet and look up so that you can see the correct English word. If you aren't sure of the spelling, but think you know the meaning of the Spanish word, spell it as best you can. Are there any questions?

The following 10 words were used:

1. vaso - glass
2. puerta - door
3. pájaro - bird
4. cabeza - head
5. barco - boat
6. ventana - window
7. casa - house
8. pierna - leg
9. muchacha - girl
10. hombre - man

In presenting the words, E held up the Spanish side of the card for 10 seconds and, after the bell rang, showed the English meaning on the other side of the card for approximately 3 seconds. He also said the English word aloud when he initially flipped the card over. This procedure was adopted so that the Ss were sure to look up from their papers and see the English word.

After the retention trial, the Ss were given three relearning trials where the same words were presented by the same technique only in a different order that was randomly determined. The instructions were:

> Did anyone get all the words right?
>
> Will each of you put your test booklet into your envelope, please. Here is another booklet with 10 pages. I'm going to give you the 10 words again, but in a different order. Remember, I'll show you the Spanish word first and then after you've written the English word I'll show you the right answer. Ready?

The answer booklets were marked on the back with the trial number so that it was possible to identify the particular trial that an S worked on. If an S got all 10 words correct on any trial he stopped and sat with his group while the others went on to the next trials. So that he would not distract the other Ss, he was instructed to look at the words and say them to himself as the others continued to work on the task.

At the completion of the retention and relearning trials, the Ss were introduced to a new learning task. This task involved the learning of 10 new Spanish words and their English equivalents. The instructions for this task began as follows:

> Now I want to see how quickly you can learn 10 new words. Here is a list, for each of you, of 10 Spanish words and their English meanings.

Each S was given a paper with these words arranged on it in the following way:

SILLA -- CHAIR
ZAPATO -- SHOE
VACA -- COW
MANZANA -- APPLE
ÁRBOL -- TREE
RELOJ -- CLOCK
PAN -- BREAD
CARNE -- MEAT
HUESO -- BONE
PERRO -- DOG

Then the instructions were continued:

> And here are 10 cards, each with one of those Spanish words on it. Starting with you, ____________, why don't you turn over the first card when I say, "Begin." Place it on the table so that everyone can see it and all of you try to find on your list what the Spanish word means in English. Call out the correct English answer as soon as you know it. Then take turns turning up a Spanish card from the center pile. After a few minutes I'll take your lists away and give you the same kind of test that I just gave you on the old words. Any questions? Alright, begin.

After the Ss had gone through the stack of cards 4 times E took away the study sheets of Spanish and English words and gave the Ss four trials on the new words following the same procedure that was utilized with the retention and relearning trials.

## Hypotheses

It is predicted that among children of high tested intelligence, those who are in small groups with other children whom they like a great deal will learn new material better than those who are with children they like less. Similarly, among children of low tested intelligence, those in high cohesive groups will learn new material better than those in low cohesive groups. Learning here includes measures of retention and relearning as well as initial post-study performance.

## Results

### Learning task scores.

The Mean scores made by individual children under the various experimental conditions, and the standard deviation estimates,[1] on all the learning tasks (Basic Learning, Retention, Relearning, and New Learning) are presented in Tables 3, 4, and 5. Figures 1, 2, and 3 are also provided as visual aids in comparing the average performance of Ss in the different conditions.

On the Basic Learning test, the maximum possible score was 15 correct words; on all subsequent tests, the maximum score was 10 correct words. On the Relearning and New Learning tasks, if a subject scored 10 on any trial he was

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[1] The estimated standard deviation (s) is calculated for small samples (McNemar, 1949).

Table 3

Mean Individual Scores on Basic Learning Task

| Experimental Condition | N | Mean | s |
|---|---|---|---|
| | Total Sample | | |
| Hi I Hi Co | 64 | 5.28 | 2.6 |
| Hi I Lo Co | 39 | 4.69 | 2.9 |
| Lo I Hi Co | 54 | 2.96 | 2.4 |
| Lo I Lo Co | 49 | 3.28 | 2.2 |
| | Girls | | |
| Hi I Hi Co | 34 | 5.79 | 2.2 |
| Hi I Lo Co | 24 | 4.58 | 2.4 |
| Lo I Hi Co | 26 | 3.27 | 2.6 |
| Lo I Lo Co | 25 | 3.68 | 2.4 |
| | Boys | | |
| Hi I Hi Co | 30 | 4.70 | 2.8 |
| Hi I Lo Co | 15 | 4.87 | 3.6 |
| Lo I Hi Co | 28 | 2.68 | 2.3 |
| Lo I Lo Co | 24 | 2.88 | 2.0 |

automatically given the same score on the subsequent trials; this occurred infrequently. This scoring procedure was adopted because it had been planned to use, as the dependent measure in Relearning and New Learning, number of trials required to reach the criterion of 100% correct; time limitations, however, prohibited giving more than three and four trials in the respective tasks.

Preliminary analyses indicated that the number of persons in a group, i.e., three or four, made no reliable difference on learning task scores so data from both types of groups

Table 4

Mean Individual Scores on Retention and Relearning Trials

| Experimental Condition | N | Retention | | Relearning trial 1 | | Relearning trial 2 | | Relearning trial 3 | |
|---|---|---|---|---|---|---|---|---|---|
| | | *M* | *s* | *M* | *s* | *M* | *s* | *M* | *s* |
| | | | | | Total Sample | | | | |
| Hi I Hi Co | 47 | 3.02 | 1.7 | 4.51 | 2.0 | 5.47 | 2.2 | 5.94 | 2.7 |
| Hi I Lo Co | 28 | 2.39 | 2.0 | 3.96 | 2.5 | 4.50 | 2.5 | 5.36 | 2.4 |
| Lo I Hi Co | 47 | 1.66 | 1.7 | 2.96 | 1.9 | 3.53 | 2.3 | 4.11 | 2.3 |
| Lo I Lo Co | 33 | 2.06 | 1.4 | 3.58 | 2.0 | 4.58 | 2.5 | 5.06 | 2.9 |
| | | | | | Girls | | | | |
| Hi I Hi Co | 29 | 3.07 | 1.5 | 4.66 | 2.2 | 5.66 | 2.2 | 6.03 | 2.3 |
| Hi I Lo Co | 16 | 2.00 | 1.5 | 3.81 | 2.6 | 4.44 | 2.4 | 5.25 | 2.4 |
| Lo I Hi Co | 23 | 2.22 | 2.0 | 3.26 | 2.2 | 3.48 | 2.6 | 4.30 | 2.7 |
| Lo I Lo Co | 16 | 2.31 | 1.5 | 3.75 | 2.0 | 4.50 | 2.6 | 5.00 | 3.2 |
| | | | | | Boys | | | | |
| Hi I Hi Co | 18 | 2.94 | 2.6 | 4.28 | 1.6 | 5.17 | 2.4 | 5.78 | 2.4 |
| Hi I Lo Co | 12 | 2.92 | 2.0 | 4.17 | 1.9 | 4.58 | 2.7 | 5.50 | 2.5 |
| Lo I Hi Co | 24 | 1.12 | 1.2 | 2.67 | 1.9 | 3.58 | 2.0 | 3.92 | 2.0 |
| Lo I Lo Co | 17 | 1.82 | 1.2 | 3.41 | 2.0 | 4.65 | 2.5 | 5.12 | 2.6 |

were combined. IQ scores, on the other hand, did make a significant difference on every learning test, with high IQ *Ss* scoring reliably higher than low IQ *Ss* in every case. The results of Median Test analyses (Siegel, 1956)[2] of the scores on each test are as follows: Basic Learning, $X^2 = 19.93$,

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[2] Nonparametric statistics were used to analyze the learning scores because the variability of distributions was restricted to a range of from 0 to 15 on Basic Learning, and from 0 to 10 on the other tests, and the obtained ranges were even narrower.

## Table 5

### Mean Individual Scores on New Learning Task

| Experimental Condition | N | Trial 1 |  | Trial 2 |  | Trial 3 |  | Trial 4 |  |
|---|---|---|---|---|---|---|---|---|---|
|  |  | *M* | *s* | *M* | *s* | *M* | *s* | *M* | *s* |
|  |  |  |  | Total Sample |  |  |  |  |  |
| Hi I Hi Co | 47 | 4.47 | 1.8 | 5.57 | 2.0 | 6.34 | 2.2 | 6.74 | 2.4 |
| Hi I Lo Co | 28 | 4.54 | 2.3 | 5.39 | 2.6 | 5.46 | 2.6 | 6.39 | 2.3 |
| Lo I Hi Co | 47 | 3.38 | 2.3 | 3.81 | 2.5 | 4.81 | 2.5 | 5.62 | 2.4 |
| Lo I Lo Co | 33 | 4.12 | 2.2 | 4.88 | 2.6 | 5.30 | 2.6 | 5.91 | 2.7 |
|  |  |  |  | Girls |  |  |  |  |  |
| Hi I Hi Co | 29 | 4.55 | 1.5 | 5.97 | 1.7 | 6.79 | 1.9 | 7.21 | 2.2 |
| Hi I Lo Co | 16 | 4.50 | 2.0 | 5.44 | 2.3 | 5.50 | 2.5 | 6.00 | 2.4 |
| Lo I Hi Co | 23 | 3.57 | 2.5 | 4.74 | 2.7 | 5.35 | 2.6 | 6.39 | 2.7 |
| Lo I Lo Co | 16 | 4.12 | 2.2 | 5.38 | 2.6 | 5.56 | 2.4 | 6.19 | 2.5 |
|  |  |  |  | Boys |  |  |  |  |  |
| Hi I Hi Co | 18 | 4.33 | 2.1 | 4.94 | 2.3 | 5.61 | 2.5 | 6.00 | 2.5 |
| Hi I Lo Co | 12 | 4.58 | 2.8 | 5.33 | 3.1 | 5.42 | 2.8 | 6.92 | 2.2 |
| Lo I Hi Co | 24 | 3.21 | 2.0 | 2.92 | 2.0 | 4.29 | 2.3 | 4.88 | 1.9 |
| Lo I Lo Co | 17 | 4.12 | 2.3 | 4.41 | 2.6 | 5.06 | 2.8 | 5.65 | 3.0 |

$p < .001$; Retention, $X^2 = 7.17$, $p < .01$; Relearning trial 1, $X^2 = 19.24$, $p < .001$; Relearning trial 2, $X^2 = 9.06$, $p < .01$; Relearning trial 3, $X^2 = 4.92$, $p < .05$; New Learning trial 1, $X^2 = 10.96$, $p < .001$; New Learning trial 2, $X^2 = 5.63$, $p < .02$; New Learning trial 3, $X^2 = 5.50$, $p < .02$; New Learning trial 4, $X^2 = 3.72$, $p < .10$. The probabilities are all two-tailed, and for the Median Test the number of degrees of freedom is always 1.

The above findings justify separate treatment of high and low IQ *Ss* in subsequent analyses. An Analysis of Variance

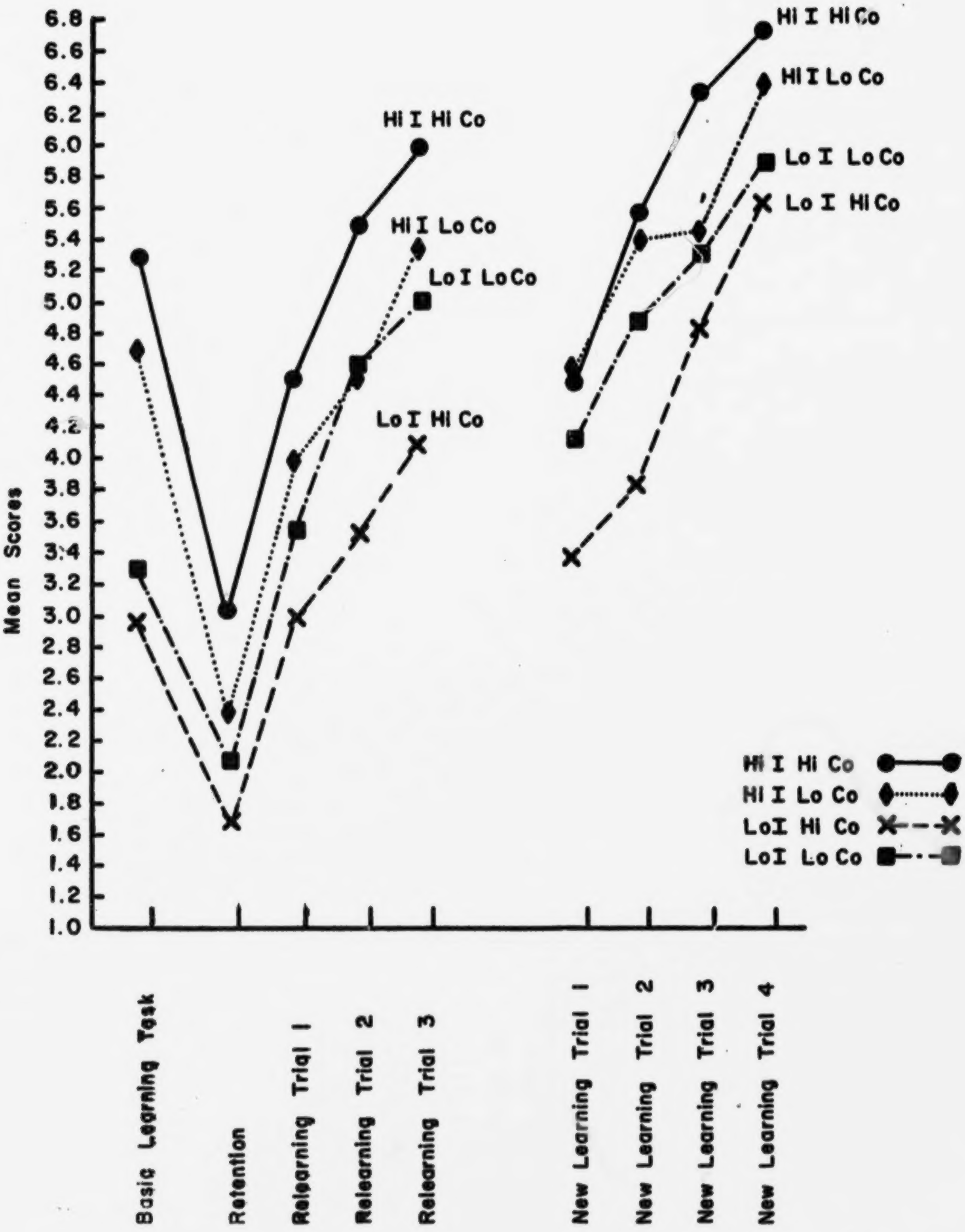

Figure 1. The experimental conditions (total sample) compared on the learning tasks.

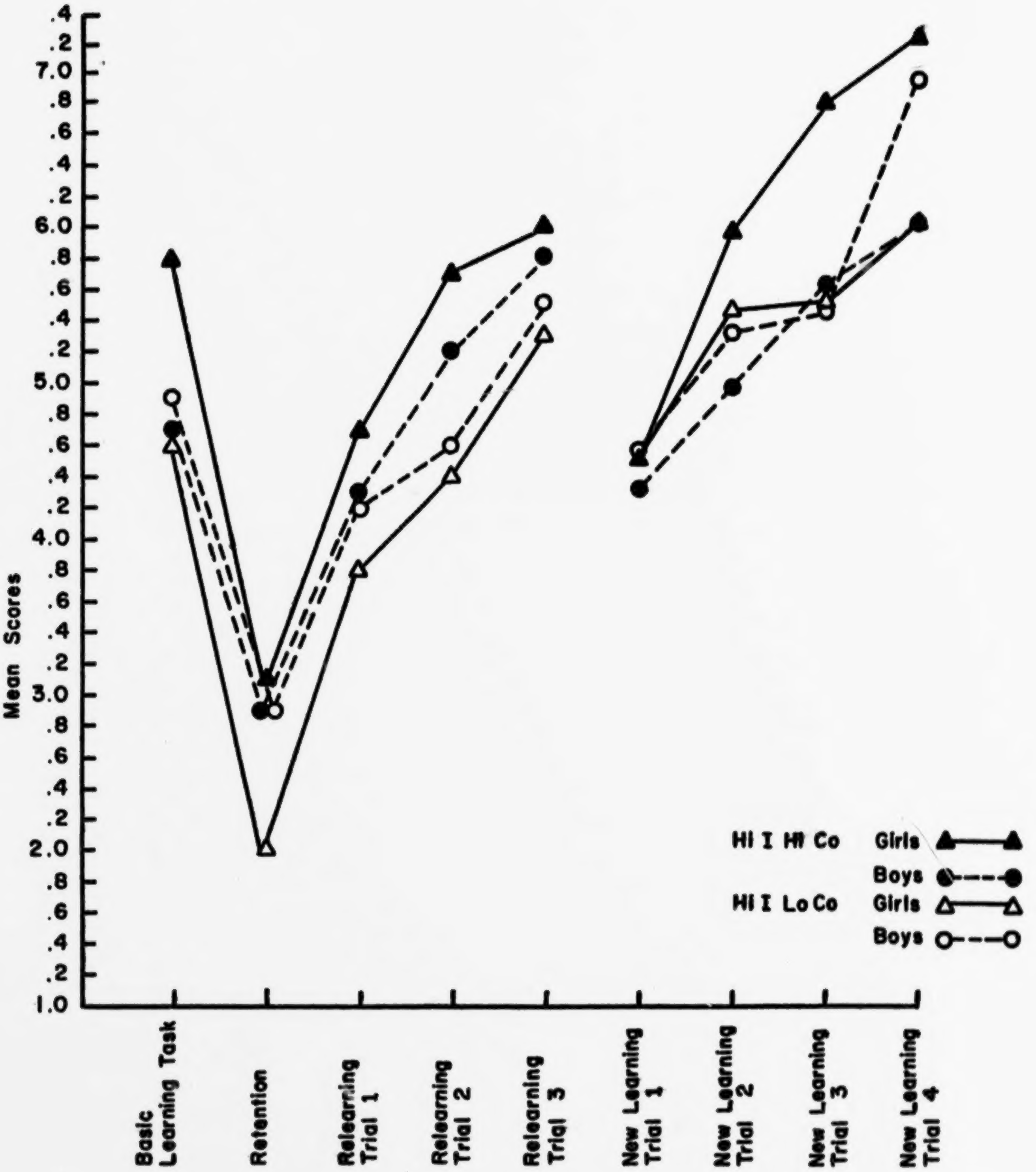

Figure 2. Hi I Ss compared, by cohesiveness condition and sex, on the learning tasks.

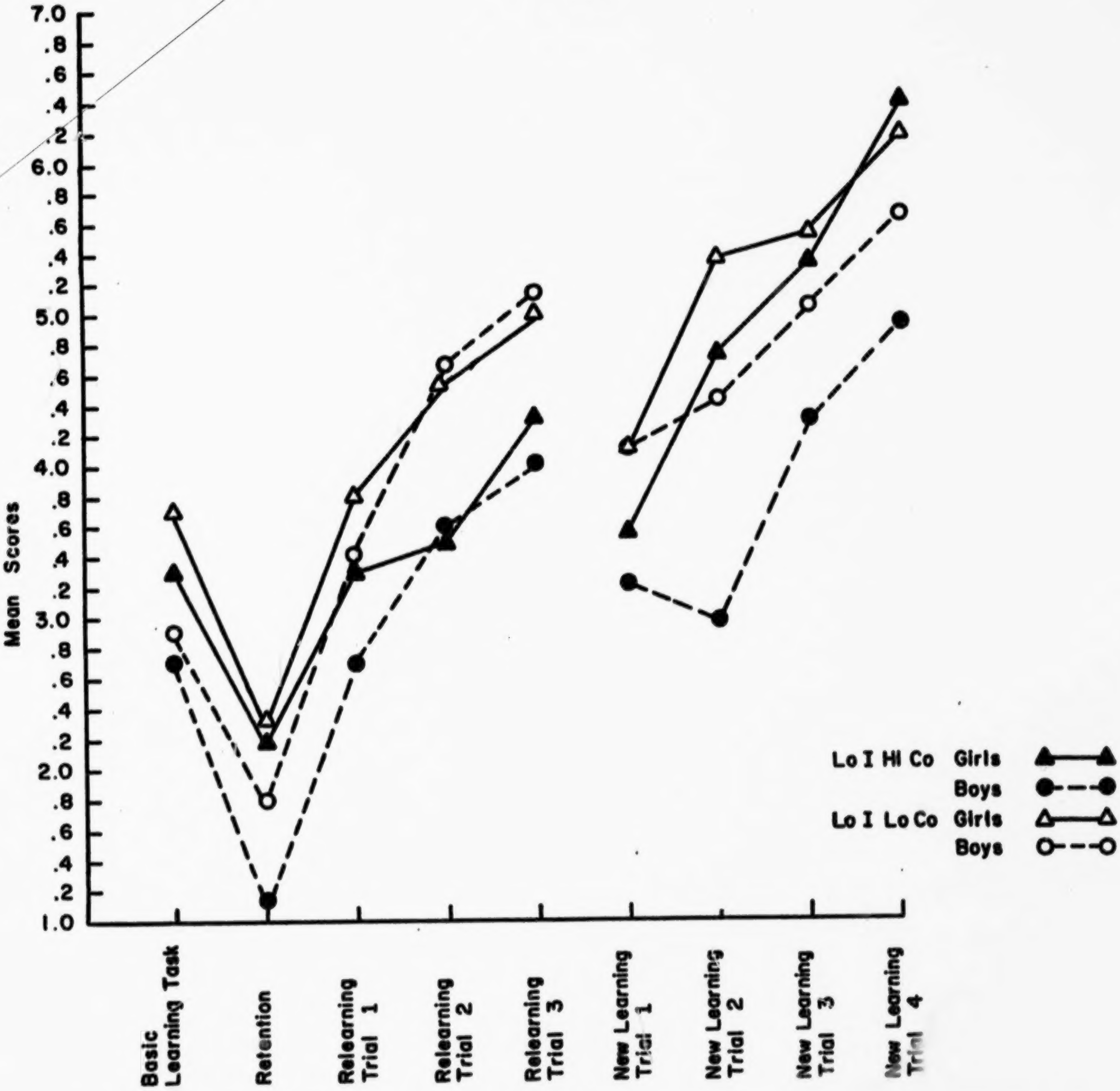

Figure 3. Lo I Ss compared, by cohesiveness condition and sex, on the learning tasks.

for frequency data (Wilson, 1955) was performed for each set of learning scores to test the effects of cohesiveness and sex. This analysis compares conditions in terms of the number of individuals within each who scored at or above the Median and the number who scored below the Median. In Tables 6 and 7 are given the results of these analyses for high IQ Ss and low IQ Ss, respectively.

Examination of Table 6, together with the Hi I Means given in Tables 3, 4, and 5 for the total sample (i.e., sexes combined), indicates that in every case except for the first New Learning trial, Hi Co Ss did better than Lo Co Ss, as was predicted. The difference between Hi Co and Lo Co Ss is statistically reliable on Retention, and on the first two Relearning trials, and is close to the standard level of significance on the third Relearning trial, and on the second and third New Learning trials. The probabilities shown in Table 6 are two-tailed. Since superiority of Hi Co over Lo Co Ss was predicted, one-tailed probabilities are legitimate and it may then be said that the differences on Retention, on all three Relearning trials, and trials 2 and 3 of New Learning are all reliable, and the difference on Basic Learning is close to reliability. Only on the first and fourth New Learning trials is cohesiveness not associated with variation in learning scores for high IQ Ss.

Table 6 shows that Hi I boys and girls did not differ in the sense of reliably higher scores for one group than the other (except on New Learning, trial 2, on which the girls

## Table 6

## Summary of Analyses of Variance (for Frequency Data) of Learning Scores made by Hi I *Ss*

| Task | Source of Variance | $X^2$ | df | p |
|---|---|---|---|---|
| Basic Learning | total | 8.38 | 3 | $<.05$ |
| | cohesiveness | 2.47 | 1 | $<.20 >.10$ |
| N = 103 | sex | 2.57 | 1 | $<.20 >.10$ |
| | interaction | 3.34 | 1 | $<.10 >.05$ |
| Retention | total | 5.96 | 3 | $<.20 >.10$ |
| | cohesiveness | 4.01 | 1 | $<.05$ |
| N = 75 | sex | --[a] | 1 | ns |
| | interaction | -- | 1 | ns |
| Relearning trial 1 | total | 5.49 | 3 | $<.20 >.10$ |
| | cohesiveness | 5.28 | 1 | $<.05$ |
| N = 75 | sex | -- | 1 | ns |
| | interaction | -- | 1 | ns |
| Relearning trial 2 | total | 6.40 | 3 | $<.10 >.05$ |
| | cohesiveness | 5.07 | 1 | $<.05$ |
| N = 75 | sex | -- | 1 | ns |
| | interaction | -- | 1 | ns |
| Relearning trial 3 | total | 3.42 | 3 | $<.50 >.30$ |
| | cohesiveness | 3.33 | 1 | $<.10 >.05$ |
| N = 75 | sex | -- | 1 | ns |
| | interaction | -- | 1 | ns |
| New Learning trial 1 | total | 2.45 | 3 | $<.50 >.30$ |
| | cohesiveness | -- | 1 | ns |
| N = 75 | sex | -- | 1 | ns |
| | interaction | -- | 1 | ns |
| New Learning trial 2 | total | 7.39 | 3 | $<.10 >.05$ |
| | cohesiveness | 2.11 | 1 | $<.10 >.05$ |
| N = 75 | sex | 4.25 | 1 | $<.05$ |
| | interaction | 1.03 | 1 | ns |
| New Learning trial 3 | total | 5.19 | 3 | $<.20 >.10$ |
| | cohesiveness | 3.54 | 1 | $<.10 >.05$ |
| N = 75 | sex | -- | 1 | ns |
| | interaction | -- | 1 | ns |

Table 6--Continued

| Task | Source of Variance | $X^2$ | df | p |
|---|---|---|---|---|
| New Learning trial 4 | total | 4.94 | 3 | <20 >.10 |
| | cohesiveness | .43 | 1 | ns |
| N = 75 | sex | 1.66 | 1 | ns |
| | interaction | 2.85 | 1 | <.10 >.05 |

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[a] If there was no possibility of obtaining a significant $X^2$, further analyses were not performed. In this case 4.01 of the total variance of 5.96 is due to cohesiveness; the remainder (1.95) is so small that there is no possibility of obtaining a significant $X^2$ for either sex or interaction. The same explanation may be applied in all cases where $X^2$ figures are not given in the table.

Table 7

Summary of Analyses of Variance (for Frequency Data) of Learning Scores made by Lo I Ss

| Task | Source of Variance | $X^2$ | df | p |
|---|---|---|---|---|
| Basic Learning | total | 2.46 | 3 | <.50 >.30 |
| | cohesiveness | --[a] | 1 | ns |
| N = 103 | sex | -- | 1 | ns |
| | interaction | -- | 1 | ns |
| Retention | total | 9.14 | 3 | <.05 |
| | cohesiveness | 2.79 | 1 | <.10 >.05 |
| N = 80 | sex | 6.13 | 1 | <.02 |
| | interaction | -- | 1 | ns |
| Relearning trial 1 | total | 3.16 | 3 | <.50 >.30 |
| | cohesiveness | 1.99 | 1 | <.20 >.10 |
| N = 80 | sex | -- | 1 | ns |
| | interaction | -- | 1 | ns |
| Relearning trial 2 | total | 4.56 | 3 | <.30 >.20 |
| | cohesiveness | 3.45 | 1 | <.10 >.05 |
| N = 80 | sex | -- | 1 | ns |
| | interaction | -- | 1 | ns |
| Relearning trial 3 | total | 1.99 | 3 | >.50 |
| | cohesiveness | -- | 1 | ns |
| N = 80 | sex | -- | 1 | ns |
| | interaction | -- | 1 | ns |

Table 7--Continued

| Task | Source of Variation | $X^2$ | *df* | *p* |
|---|---|---|---|---|
| New Learning trial 1<br>N = 80 | total | 3.23 | 3 | $<.50>.30$ |
| | cohesiveness | 3.13 | 1 | $<.10>.05$ |
| | sex | -- | 1 | ns |
| | interaction | -- | 1 | ns |
| New Learning trial 2<br>N = 80 | total | 9.47 | 3 | $<.05$ |
| | cohesiveness | 3.09 | 1 | $<.10>.05$ |
| | sex | 2.55 | 1 | $<.20>.10$ |
| | interaction | 3.83 | 1 | .05 |
| New Learning trial 3<br>N = 80 | total | 2.37 | 3 | .50 |
| | cohesiveness | -- | 1 | ns |
| | sex | -- | 1 | ns |
| | interaction | -- | 1 | ns |
| New Learning trial 4<br>N = 80 | total | 6.01 | 3 | $<.20>.10$ |
| | cohesiveness | 1.30 | 1 | ns |
| | sex | 2.46 | 1 | $<.20>.10$ |
| | interaction | 2.25 | 1 | $<.20>.10$ |

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[a] If there is no possibility of obtaining a significant $X^2$, further analyses are not performed.

did significantly better); and there is little indication of reliable cohesiveness - sex interactions. What is not revealed in Table 6, however, but can be clearly seen by inspecting Figure 2 (and the Mean scores for high IQ boys and girls shown in Tables 3, 4, and 5) is that the differences in learning between Hi Co and Lo Co high IQ *S*s are contributed to primarily by the girls. High IQ girls in Hi Co groups surpassed those in Lo Co groups on every learning test. Among the high IQ boys, on the other hand, the average scores of those under Hi Co conditions and those under Lo Co conditions are generally close together, and on several tests the Mean

Lo Co score is greater than the Mean Hi Co score, in reverse of the predicted direction. Separate Median Tests were performed for girls and boys to evaluate the significance of Hi Co - Lo Co differences on each learning test. For the high IQ girls, a significant $X^2$ (i.e., $p < .05$, two-tailed) was obtained, indicating a reliable relationship between cohesiveness and learning, on the following tests: Basic Learning ($X^2 = 5.97$); Retention ($X^2 = 5.67$); Relearning trial 1 ($X^2 = 3.92$); Relearning trial 2 ($X^2 = 5.24$); New Learning trial 3 ($X^2 = 5.67$); and New Learning trial 4 ($X^2 = 5.67$). In contrast, among the high IQ boys, conditions of high and low cohesiveness made no reliable difference on any learning measure.

We may look at the same data in another, quite simple manner. On every one of the nine learning measures, Hi I Hi Co girls did better, on the average, than Hi I Lo Co girls. Using the Sign Test (Siegel, 1956), we find that the probability that such results are due to chance is .004 (two-tailed). This test is not strictly applicable since our measures are all taken on the same subjects,[3] but it is suggestive. For the high IQ boys, on the other hand, average Hi Co scores exceeded Lo Co scores on only five out of nine measures; the two-tailed probability that this is a chance phenomenon is 1.00.

Examination of Figure 2 shows clearly that among high IQ children the girls in high cohesive groups surpassed all others (Hi Co boys, Lo Co girls and boys) on the learning measures.

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[3] Some Ss are represented only in the Basic Learning data since either they or their fellow group members were absent for the subsequent learning experiences.

Turning now to the low IQ *Ss*, we find a strikingly different pattern of results. First of all, it can be seen from Tables 3, 4, and 5, as well as Figure 1 that on every one of our learning task measures the average score of Lo Co *Ss* is greater than the average score of Hi Co *Ss*, in direct opposition to our prediction and to the results obtained on Hi I *Ss*. The differences, however, between the Hi Co and Lo Co conditions are not statistically reliable (two-tailed probabilities), as is indicated in Table 7. Significance is approached on Retention, Relearning trial 2, and New Learning trials 1 and 2.

Separate analyses were performed on the scores made by boys and girls. Among the Lo I girls, the average Lo Co score exceeds the average Hi Co score in every case except for the last New Learning trial, but none of these differences is statistically reliable (Median Tests). On Relearning trial 2, a $X^2$ of 2.92 was obtained, which approaches significance ($p < .10 > .05$). Using the Sign Test, however, we find that a pattern of eight results out of nine in one direction (Lo Co >Hi Co) has a two-tailed chance probability of .04. For the Lo I boys, the average Lo Co score is greater than the average Hi Co score in every case ($p = .004$). Median Test analyses of the data on each learning test yielded a $X^2$ of 3.36 ($p < .10 > .05$) on Retention, and a $X^2$ of 6.87 ($p < .01$) on New Learning trial 2. All other $X^2$'s are nonsignificant.

Time measure

On the Basic Learning task an additional measure was obtained, i.e., one other than number of correct words given on the test. For each group of children, the experimental assistant recorded the time it took to match Spanish sentences to their English equivalents. This was a group activity, preliminary to individual study. The results on this measure were not formally predicted but it was expected that Hi Co groups would work faster than Lo Co groups composed of children with similar IQ scores, i.e., either high or low.

The results are shown in Table 8. Differences between Means were evaluated with the *t* test (McNemar, 1949). Hi Co groups were significantly faster than Lo Co groups within the total high IQ sample, i.e., boy and girl groups considered together, and within the high IQ sample of girls. The difference between Hi Co and Lo Co groups of high IQ boys was in the same direction but not statistically reliable. For the low IQ groups, the results are quite different; there are no reliable differences between Hi Co and Lo Co groups within the total sample, or for girls or boys considered separately. In each case, moreover, the Lo Co groups were slightly faster, on the average, than the Hi Co groups, in reverse of the findings for the high IQ groups.

It is of considerable interest that on this time measure the Hi I groups were faster than the Lo I groups, on the average, as one would expect, under Hi Co conditions, but under Lo Co conditions, Lo I groups were *faster* than Hi I groups.

## Table 8

## Time Taken by Groups to Match Spanish to English Sentences in Basic Learning Task

| Condition | No. of Groups | Mean Time in seconds | *s* | *t* | *p*[a] |
|---|---|---|---|---|---|
| | | **Total Sample** | | | |
| Hi I Hi Co | 18 | 112.78 | 19.1 | 2.20 | <.05 |
| Hi I Lo Co | 12 | 147.33 | 51.9 | | |
| Lo I Hi Co | 17 | 135.53 | 48.5 | -- | ns |
| Lo I Lo Co | 15 | 127.00 | 26.3 | | |
| | | **Girls** | | | |
| Hi I Hi Co | 10 | 111.00 | 19.3 | 2.12 | .05 |
| Hi I Lo Co | 8 | 134.12 | 27.1 | | |
| Lo I Hi Co | 8 | 130.88 | 66.3 | -- | ns |
| Lo I Lo Co | 8 | 117.88 | 16.6 | | |
| | | **Boys** | | | |
| Hi I Hi Co | 8 | 115.00 | 19.8 | 1.41 | ns |
| Hi I Lo Co | 4 | 173.75 | 82.3 | | |
| Lo I Hi Co | 9 | 139.67 | 28.8 | -- | ns |
| Lo I Lo Co | 7 | 137.43 | 32.5 | | |

[a] Probabilities are two-tailed.

In neither case is the difference between the IQ conditions statistically reliable (t = 1.80, df = 33, and t = 1.23, df = 25, for Hi Co and Lo Co, respectively) but under the Hi Co condition the two-tailed probability approaches significance (*p* <.10 >.05).

### Changes in sociometric ratings

Approximately two weeks after the last group interactions (for Retention, Relearning, and New Learning) another sociometric test (II) was given in each class by the regular teacher. The procedure followed was similar to that described for Sociometric Test I. By comparing Ss' ratings of their fellow group members on Sociometric Test II with ratings made on Sociometric Test I we could determine whether changes, if any, were related to the experimental conditions. No formal predictions were made prior to the experiment, but neutral pleasant interaction is generally expected to produce an increase in interpersonal liking.

The data shown in Table 9 are taken from those Ss who were present in their groups for Retention, Relearning, and New Learning and who were also present when the second sociometric test was given. Absentees on the latter occasion (or transferred students) account for the small differences in subject numbers per condition between Tables 4 and 5, on the one hand, and Table 9.[4]

It can be seen from Table 9 that the children rated their fellow group members significantly more favorably after their group experience than before when the groups had been set up to be low in cohesiveness. This is true of both Hi I girls and boys, and Lo I girls and boys. Children who had been in Hi Co groups, on the other hand, did not change their ratings

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[4] One girl whose learning scores were not used in calculating Hi I Hi Co average scores on Retention, Relearning, or New Learning, because she had cheated, is nevertheless included in the figures presented in Table 9 and Table 10.

### Table 9

### Changes in Average Ratings of other Group Members following Interaction in the Learning Tasks

| Condition | No. of Ss | Mean Ratings<br>Socio Test I | Mean Ratings<br>Socio Test II | t | p |
|---|---|---|---|---|---|
| | | **Girls** | | | |
| Hi I Hi Co | 30 | 4.76 | 4.41 | 4.50 | <.001 |
| Hi I Lo Co | 16 | 2.97 | 4.00 | 4.48 | <.001 |
| Lo I Hi Co | 21 | 4.53 | 4.58 | .45 | ns |
| Lo I Lo Co | 15 | 2.95 | 3.74 | 2.72 | <.02 |
| | | **Boys** | | | |
| Hi I Hi Co | 18 | 4.38 | 4.56 | 1.29 | ns |
| Hi I Lo Co | 15 | 2.84 | 3.35 | 2.32 | <.05 |
| Lo I Hi Co | 22 | 4.53 | 4.50 | .38 | ns |
| Lo I Lo Co | 17 | 2.95 | 3.40 | 2.05 | <.10>.05 |

### Table 10

### Changes in Group Cohesiveness Indices (GCI) following Interaction in all the Learning Tasks

| Condition | No. of Groups | No. increases in GCI | No. decreases in GCI | No. no change in GCI |
|---|---|---|---|---|
| | | **Girls** | | |
| Hi I Hi Co | 9 | 0 | 9 | 0 |
| Hi I Lo Co | 6 | 6 | 0 | 0 |
| Lo I Hi Co | 7 | 4 | 2 | 1 |
| Lo I Lo Co | 5 | 4 | 1 | 0 |
| | | **Boys** | | |
| Hi I Hi Co | 5 | 4 | 1 | 0 |
| Hi I Lo Co | 4 | 3 | 1 | 0 |
| Lo I Hi Co | 8 | 1 | 2 | 5 |
| Lo I Lo Co | 5 | 4 | 1 | 0 |

of one another (which were initially high), except in the case of Hi I girls who rated each other on the second sociometric test significantly lower than they had on the first. Although the average decrease is small, it is highly reliable.

Table 10 shows these data differently, in terms of changes in group cohesiveness indices (GCI). The ratings from which the GCIs were calculated are those given by children who were present for Retention, Relearning, and New Learning and for Sociometric Test II. Lo Co groups tended to have a higher index on the second sociometric test while Hi Co groups (except for Hi I girls) tended to have a higher or the same index. Of the nine Hi I Hi Co groups of girls, each one decreased in GCI following group interaction.

## Discussion

The results on all the learning tests considered together indicate that, in general, high IQ children who were in high cohesive groups did reliably better than high IQ children who were in low cohesive groups. For low IQ children, however, cohesiveness made no difference, although children in low cohesive groups tended to do slightly better than children in high cohesive groups. The findings for high IQ children thus confirm our hypothesis while those for low IQ children do not and suggest an opposite tendency.

Post-hoc consideration of our data has suggested an explanation which seems reasonable in the light of other recent work on human learning. We predicted that children under high cohesive conditions would learn better than children under low cohesive conditions because the former, working in the presence of liked others, would be more highly motivated, or have greater "drive." Since attitudes are presumed to have a drive component, individuals with highly positive attitudes toward other group members should, we reasoned, have a higher general drive level, other things being equal, than individuals with more neutral or slightly negative attitudes toward their fellow group members. While it is true that the higher the drive, the better the learning for simple tasks, where alternative responses are few, it is also known that when a complex task is to be learned, high drive will strengthen incorrect competing responses as well as correct ones, thus impeding the learning process. The implications of this phenomenon for our experimental conditions seem clear. High IQ children were reliably superior to low IQ children on all the learning tests indicating that our tasks were relatively more simple for the former than the latter. Among the former, then, increased drive (which we assume is associated with working in high cohesive groups) should have improved test performance, while it should have served to depress it among the latter.

Within the high IQ sample, the cohesiveness conditions made less difference to the boys than to the girls. Why this should be the case is not immediately clear. The type of verbal learning tasks which we employed may be essentially girls' tasks at the developmental period represented by ages 10 and

11.[5] High IQ girls may be especially at ease in such learning situations, in which case the heightened drive provided by the high cohesive condition should serve to improve learning for the girls but not for the boys. Observations of boy and girl groups made by E and the experimental assistant during the learning sessions support the view that the former were less at ease and more distractable.

Within the low IQ sample, the average scores of children in high cohesive groups tended to be somewhat lower than that of children in low cohesive groups regardless of sex, although the differences appear to be greater for boys. This is congruent with our assumption that the learning tasks were more difficult (complex) for low IQ children and for boys.

The results obtained on a time measure in the Basic Learning Task (number of seconds it took for each group to match Spanish sentences to English equivalents) is in line with, and supports, the data obtained on the learning tests. High cohesive groups were significantly faster than low cohesive groups within the high IQ sample; and, again, this was especially true of the girls. Within the low IQ sample, however, the low cohesive groups worked faster than the high cohesive groups, although not reliably. Thus, for the high IQ Ss, the condition of working with liked others facilitated performance in the sense of increasing task speed while, for the low IQ Ss, this same condition seemed to interfere with performance.

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[5] Our own data show that the girls did generally better than the boys on the learning tests although the differences were not statistically reliable.

Both the learning test scores and the time measure data are relevant to the general question of whether working with liked others is beneficial to effective task performance or inhibiting. Previous investigations, discussed earlier, have sometimes supported one hypothesis and sometimes the other. We suggest that one crucial variable may be task complexity (represented here by differences in capability of Ss to deal with the same task).

Our findings on changes in sociometric ratings of fellow group members following interaction in the learning tasks seem to us to provide additional support for our S-R learning theory framework. In all conditions, except one, the children tended either to rate other group members higher than they had previously or to rate them the same. Increased favorability of ratings were statistically reliable for Lo Co Ss, both boys and girls, and both Hi I and Lo I. Since Hi Co Ss started with high ratings of group members (close to the maximum of 5.0), one could expect only no change or decreased favorability. The former result was obtained for Hi Co boys, both Hi I and Lo I, and for Lo I Hi Co girls. For Hi I Hi Co girls, however, sociometric ratings decreased significantly, although the absolute value of the decline was small. In attempting to understand this finding, it is first of all important to keep in mind that feedback from the learning tasks was the same for all subjects. Following Basic Learning, all the children were told by E that their "class" had done well. Following the other learning tasks, E provided no feedback at all. Success or failure compared to other children was not, therefore, a likely variable. The Hi I Hi Co girls were superior to all other experimental conditions on every learning measure but how well they thought they were doing we do not know. The fact that their ratings of fellow group members declined is explainable, we suggest, on the basis of effort or the concept of reactive inhibition (Hull, 1951). No differential reward was provided by the investigators to subjects in the different experimental conditions, but it is reasonable to infer differential effort from the superior performance of Hi I Hi Co girls. Reactive inhibition in the presence of stimuli (other group members) should decrease the positive valence of these stimuli or should produce avoidance tendencies (just as reward in the presence of stimuli should increase the positive valence of these stimuli).

We are raising issues here that call for considerably more thought and additional investigation. As is usually the case in psychological research, our findings have provoked new questions while providing qualified support for our initial hypothesis.

## TASK PERSISTENCE AS A FUNCTION OF COHESIVENESS

### Method

#### Subjects

Two hundred and six (206) fourth and fifth grade children from the same classes that participated in the learning tasks served as Ss in this part of the experiment. The male-female ratio was 96:110. The Mean non-language IQ for the total group, based on an N of 205, was 111.35.

#### Procedure

All children in the participating classes were given a second sociometric test (Sociometric Test II) which was administered in the same way as the first, described previously. Sociometric Test II was given two days prior to the persistence task (and about 35 days after Sociometric Test I) to get a new measure of liking on the basis of which groups could be set up so as to be either high or low in cohesiveness, as previously defined.

Ss were again selected on the basis of IQ similarity (high or low) and their sociometric ratings of others and others' ratings of them. This time groups of two persons were formed and Ss were matched on their non-language IQ scores, since the persistence task consisted of reproducing block designs. In the same manner described previously for the learning tasks, groups of same-sex children were formed so as to be either Hi I Hi Co, Hi I Lo Co, Lo I Hi Co, or Lo I Lo Co. Table 11 describes each of these conditions in terms of number of groups (i.e., pairs), Mean cohesiveness index of groups, and Mean non-language IQ of individual members. The ranges of individual non-language IQ's for the Hi I and Lo I groups, respectively, were 177 to 108 (Mean = 125.41) and 119 to 61 (Mean = 96.30). The Mean group IQ's for the Hi I groups ranged from 157 to 115; for the Lo I groups the range was 113 to 74. The range of group cohesiveness scores for the Hi Co groups was 5.0 to 4.0 (Mean = 4.80); for the Lo Co groups it was 3.5 to 1.0 (Mean = 2.30).

Table 11

Summary of Experimental Conditions for the Persistence Task

| Condition | No. of Groups | Mean Group Cohesiveness Index | Mean IQ |
|---|---|---|---|
| Hi I Hi Co | 36 | 4.79 | 125.64 |
| Hi I Lo Co | 17 | 2.32 | 124.91 |
| Lo I Hi Co | 29 | 4.79 | 95.52 |
| Lo I Lo Co | 21 | 2.23 | 91.41[a] |
| Total | 103 | | |

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[a] The non-language IQ score of one S in this condition was not known but was assumed to be low.

On the day that E arrived to conduct the experiment, he made the following introductory remarks to the class as a whole before calling pairs from the class. The order in which the pairs were then called was pre-arranged on a random basis.

> It's good to see you again and be back in your class. By the way, I want you to know that your class did well on the Spanish test. Today I have another activity which I believe you will enjoy. This one is quite a bit different from what we did before. I will explain what I have in mind when we get to the __________ room. I'm going to ask you to work together in pairs today instead of in groups of three or four. My assistant and I have prepared a list of pairs of pupils. Let's start with __________ and __________.

The task consisted of 16 block designs taken from the Wechsler Intelligence Scale for Children (WISC) and the Wechsler Adult Intelligence Scale (WAIS). Designs from the two scales were chosen and combined so that they appeared to represent a continuum ranging from very easy to very difficult. The sequence of task designs is presented below:

| Task Design Number | Wechsler Scale and Number |
|---|---|
| 1 | WISC B |
| 2 | WISC C |
| 3 | WISC 1 |
| 4 | WISC 2 |
| 5 | WISC 3 |
| 6 | WISC 4 |
| 7 | WAIS 2 |
| 8 | WAIS 4 |
| 9 | WAIS 5 |
| 10 | WAIS 6 |
| 11 | WISC 5 |
| 12 | WISC 6 |
| 13 | WISC 7 |
| 14 | WAIS 8 |
| 15 | WAIS 9 |
| 16 | WAIS 10 |

Designs 1-10 are four-block designs while 11-16 are nine-block designs.

Each pair of Ss was given the following instructions:

(E takes 4 blocks in hand.)

You see these blocks. They are all alike. On two sides they are all red; on two all white; and on two, half red and half white. (E turns blocks.) I'm going to put them together to make a design. Watch me. (E arranges blocks slowly into the design shown on WISC card A without exposing A to subjects. E leaves model intact. E gives 4 other blocks to the subjects.) Now let's see you two make one just like this. I want you to work together. Maybe one of you can try and get the right side while the other works on the left.

Now here's a picture of the design you just made. (E shows card A to the subjects.) You see, the top of these blocks looks the same as this picture. Don't worry about what these sides look like. (point) I have pictures of other designs. I'm going to show them to you one at a time and I want you to put the blocks together to make them look like the picture. You are to work together and as fast as you can. Here's the next design. Go ahead and tell me when you have finished.

(For all subsequent designs up to #11.)

Now make one like this. Tell me when you have finished.

(When design #11 is reached, E takes out the other five blocks.)

For this design you are going to need nine blocks. Try to make one like it and tell me when you are finished.

A group, i.e., pair of Ss, was permitted to work on one design for a maximum of two minutes. Each time a design was correctly reproduced within this time period, the pair was presented with a new one. When the pair reached a design which they could not reproduce within two minutes, E, at the end of that time, said, "Stop. You've been working on this design for two minutes. Would you like to continue working on this design or stop on this one and try another design? You two decide together." This question was intended as the major measure of task persistence. If a pair decided to continue working on the same design it was scored as having persisted, and the Ss were permitted to work on the design until they reproduced it correctly. If a pair chose to try another design, that is, if the Ss did not persist, E said, "Would you like a different design that is easier or a different design that is just as hard?" WAIS cards 1 or 7 were given to such pairs, regardless of whether they said "hard" or "easy." Card 1 was presented if the pair was still working with four-block designs and card 7 if the pair had been working on nine-block designs. Ss were permitted to work on the new design until they completed it and then were sent back to their class.

## Hypothesis

It is predicted that more high cohesive than low cohesive dyads, of similar measured intelligence, will choose to persist on a difficult problem.

## Results

The formal hypothesis predicted that more Hi Co pairs would choose to persist on the difficult design than Lo Co pairs. In addition to the data necessary to test this prediction, data were also obtained on choice of an easy or hard design to replace the one a pair decided to give up on, and number of designs which were correctly reproduced. Table 12 shows these findings for each experimental condition.

Chi Square (corrected for continuity) or Fisher's exact probability test (Siegel, 1956) was used to analyze the differences between high and low cohesive groups with respect to

## Table 12

### Persistence on a Difficult Design and Number of Block Designs Correctly Reproduced by High Cohesive and Low Cohesive Dyads

| Experimental condition | No. of pairs | No. of pairs which chose to persist | No. of pairs which chose not to persist | | | M designs correctly reproduced | s |
|---|---|---|---|---|---|---|---|
| | | | | No. which chose another hard design | No. which chose an easier design | | |
| | | **Total Sample** | | | | | |
| Hi I Hi Co | 36 | 4 | 32 | 25 | 7 | 6.8 | 3.4 |
| Hi I Lo Co | 17 | 2 | 15 | 12 | 3 | 7.6 | 3.0 |
| Lo I Hi Co | 29 | 4 | 25 | 19 | 6 | 5.3 | 3.5 |
| Lo I Lo Co | 21 | 3 | 18 | 13 | 5 | 4.5 | 3.2 |
| | | **Girls** | | | | | |
| Hi I Hi Co | 21 | 0 | 21 | 16 | 5 | 6.9 | 3.7 |
| Hi I Lo Co | 7 | 1 | 6 | 4 | 2 | 9.0 | 2.8 |
| Lo I Hi Co | 15 | 1 | 14 | 9 | 5 | 5.7 | 3.8 |
| Lo I Lo Co | 12 | 2 | 10 | 7 | 3 | 5.2 | 3.9 |
| | | **Boys** | | | | | |
| Hi I Hi Co | 15 | 4 | 11 | 9 | 2 | 6.6 | 3.0 |
| Hi I Lo Co | 10 | 1 | 9 | 8 | 1 | 6.7 | 2.9 |
| Lo I Hi Co | 14 | 3 | 11 | 10 | 1 | 4.9 | 3.2 |
| Lo I Lo Co | 9 | 1 | 8 | 6 | 2 | 3.7 | 1.7 |

the number within each condition which chose to persist and the number which chose a new design. Hi Co and Lo Co pairs did not differ significantly either within the total sample, among the girls, or among the boys, and this was true for both high and low IQ Ss. A comparison between high and low IQ pairs also indicated no reliable difference as a function of non-language intelligence.

Similar analyses were performed on the frequencies of choice for a hard or an easy design by groups which preferred to try a new one. Hi Co and Lo Co groups did not differ reliably under either the high or low IQ condition, within the total sample, or among either the girls or boys. Further, there was no difference on this measure between high IQ and low IQ subject pairs.

Table 12 shows, for each experimental condition, the Mean number of designs correctly reproduced, within the maximum time of two minutes per design. A Median Test indicated that high IQ pairs reliably surpassed low IQ pairs on this measure ($X^2 = 13.28$, $df = 1$, $p < .001$), but Analyses of Variance for frequency data (Wilson, 1956) applied to high IQ and low IQ pairs, separately, showed that in neither case was either cohesiveness or sex a significant variable.

## Discussion

The data obtained on persistence do not support our hypothesis. Because of the fact that very few groups chose to persist on a difficult design, only 13 out of a total of 103, we believe that our test of the hypothesis was inadequate. In particular, we feel that the question asked of each group was a poor one since it offered the children an alternative of a new design, immediately. It might have been better to ask whether the Ss wished to stop or persist, and then to offer a new design. Supporting our feeling that our measure was a poor one is the fact that dyads high in non-language IQ score did not differ from those of low IQ whereas the former successfully reproduced reliably more designs than the latter prior to reaching the "difficult" one. It is well known that persistence on a task is positively related to past success or reward, but our findings do not reflect this phenomenon.

When the groups which chose to try a new design were asked if they preferred one as hard or easier than the one they had not been able to reproduce within the time limit, the large majority (69 out of 90) chose another difficult design. Again, neither cohesiveness nor IQ made a difference.

Although no formal prediction was made regarding number of designs correctly reproduced, Hi Co dyads were expected to surpass Lo Co dyads similar to them in measured non-language IQ. This was not found to be the case. In view of our generally positive findings on the learning tasks, these negative data on design reproduction performance are puzzling. It may be important that in the learning tasks, our measures were taken on individuals working in either high or low cohesive groups whereas, on the persistence task, the two members of a group worked together and their joint performance was measured. Whether variables were introduced by this latter procedure which confounded the effects of liking for one's partner, or whether the degree of liking between pairs of children simply made no difference, we do not know.

We suggest that future research on this question should utilize not one but a variety of tasks as well as a more sensitive measure of persistence.

## UNIFORMITY AS A FUNCTION OF COHESIVENESS

### Method

### Subjects

The same eight classes utilized for the Learning Tasks and the Persistence Task were also involved in this portion of the investigation, which can be divided into three stages. Stage 1, the administration of two short rating scales (Pretests) by the teacher, was carried out in the classroom. One hundred and seventy-four Ss (82 boys and 92 girls) with a Mean IQ of 110.53 (based on an N of 172) were present for the Pretests. Stage 2, the experimental induction and measurement of a group standard, involved 190 Ss (85 boys and 105 girls) with a Mean IQ, based on an N of 188, of 111.08. Stage 3, the measurement of uniformity over time, was carried out one week after Stage 2. Participating in this last stage were 166 Ss (73 boys and 93 girls) with a Mean IQ of 110.76 (based on an N of 164).

### Procedure

Stage 1: Pretests of activity preferences. Prior to the introduction of uniformity pressures regarding activity preferences, pretest measures were obtained. The classroom teachers administered the following two forms (in counterbalanced order across the different classes), asking the children to rank from high (1) to low (6) the activities presented on each form. Each *S* worked alone.

### SCHOOL ACTIVITIES LIST

____ joke with the other children in class
____ learn something new I didn't know before
____ daydream or rest
____ answer questions in class
____ study or review my lessons
____ play games in class

### HOME ACTIVITIES LIST

____ play by myself or work on a hobby
____ help with chores around the house
____ play outside with my friends
____ watch television
____ daydream or rest
____ go visit a friend

These forms were not administered in one of the eight participating classes as a result of a scheduling error.

*Stage 2: Induction of uniformity*. High and low cohesive groups of three or four same-sex children were formed on the basis of information obtained from Sociometric Test II (previously described). The same procedure which was followed in forming groups for the Learning Tasks was again applied to compose these new groups, taking measured total IQ score into account. Table 13 describes the Hi I Hi Co, Hi I Lo Co, Lo I Hi Co, and Lo I Lo Co groups that were formed for this portion of the investigation. The range of IQ scores for Ss placed in high IQ groups is 161 to 107; the range for Ss placed in low IQ groups is 121 to 172. The range of group cohesiveness indices for Hi Co groups is 5.0 to 4.2, and for Lo Co groups, 3.5 to 1.8.

Table 13

Summary of Experimental Conditions for Induction of Uniformity

| Condition | Mean Group Cohesiveness Index | Mean IQ | No. of Groups | Total No. of Ss |
|---|---|---|---|---|
| Hi I Hi Co | 4.64 | 121.27 | 19 | 60 |
| Hi I Lo Co | 2.90 | 123.18 | 10 | 33 |
| Lo I Hi Co | 4.64 | 101.90[a] | 19 | 59 |
| Lo I Lo Co | 2.57 | 98.03[b] | 12 | 38 |
| | | Total | 60 | 190 |

[a] based on an N of 58.

[b] based on an N of 37.

On the day of the experiment, E came to a classroom, greeted the class and announced that he would again call groups of children into the experimental room. The order in which groups were called was prearranged on a random basis.

When a group entered the experimental room, E spoke as follows:

> Today I'm going to tell you a story. It's a true story about a boy (girl)[5] in another school. This boy (girl) has some problems and we are interested in finding out how other children his (her) age feel about these problems and whether children can possibly help him (her). Listen very carefully, see what you think, and then we'll talk about it.

E then read the first of two stories to the Ss. One story was designed to elicit attitudes about home activities and the other to elicit attitudes about school activities. These were presented in randomly varied order from group to group. Following discussion of the first story, which was guided by three standard questions asked by E, the second story was introduced, in the following way:

> Now I'm going to tell you about another boy (girl). Listen carefully again because we'll talk about his (her) problems just like we did with ____________.

The Home Story (about Jim or Jane) and The School Story (about Tom or Theresa), followed by the questions used to stimulate discussion of each, respectively, are presented below.

### School Story of Tom (Theresa)

> This is a story about an 11 year old boy named Tom (Theresa). His parents and his teacher know that he's a pretty smart boy. He's healthy and about medium sized compared to the other boys in his class. His teacher and his parents are worried about him. He doesn't like to come to school. When he gets there he fools around or doesn't pay attention. He doesn't do his best. He doesn't like to work on new lessons and he doesn't like to study old ones. There is very little in school that he enjoys doing. He mopes around and isn't interested in much of anything except recess and going home.

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[5] The sex of the story's protagonist was made to coincide with that of the group members.

### Questions

1. Why do you think Tom (Theresa) acts this way?
2. What is school for, anyway?
3. How can you get the most out of school?

### Home Story of Jim (Jane)

> This is a story about an 11 year old boy named Jim (Jane). Jim enjoys school very much but he doesn't have very much fun when he is at home. He's healthy and about medium sized compared with the other children on his street but his parents are worried about him because he doesn't get along well with the other children. He doesn't like their ideas about things and doesn't like to play with them. When he's in the house he just mopes around and doesn't know how to have fun by himself. And he won't help his parents with jobs around the house, either. He's only happy when he's at school.

### Questions

1. Why do you think Jim (Jane) acts this way?
2. What kinds of things could he do at home?
3. What do you like to do at home?

During the discussion periods (which lasted approximately 5 minutes) E attempted to have each S in a group give at least one answer or reaction to each of the questions. This was accomplished in all but a very few cases. After the discussion, E placed on a stand in front of the Ss a large 48" x 36" poster on which was printed a list of the same six school activities (or a list of the six home activities) which Ss had previously rated on the Pretests. E then said,

> Here is a chart with a list of six things which you do at school (at home) at different times. Your teacher had you look at this list once before in class, didn't she? Read the list carefully again. Think about Tom (Theresa or Jim or Jane) and his (her) troubles. Which of these

> activities should he (she) enjoy the most in order to get the most out of school (out of being at home)? You decide among yourselves and then I'll hang a number 1 in the space in front of that activity. Remember, decide as a group.

When Ss had agreed on number 1 E said,

> Now which activity is next most important. We'll put a 2 in front of that one.

E continued to do this until all 6 activities were ranked by the group.

After the group had agreed on the ranking of the activities, E handed each child a mimeographed list of the six activities and said,

> Now I want each of you to fill out the list for yourselves. On this list I want your own personal, private feelings about how much you actually enjoy doing each of these activities. Don't put your name on the paper and don't let anyone see your answers. Be very honest and, remember, don't put your name on the paper. Put a 1 in front of the activity you enjoy most, a 2 in front of the activity you enjoy next most, and so on.

While the Ss were filling out their own lists the poster with the group rankings remained on the stand in front of them. No explicit mention was made of the poster, but an S could look at it if he desired. This same procedure for getting group and individual rankings was followed after the discussion of each of the two stories.

Ss' papers were collected in such a way that each child could be identified, so it was later possible to compare an S's original rankings of the school and home activities on the Pretests with his rankings on the Post Uniformity Induction tests made after the activities had been evaluated by his group.

Stage 3: Uniformity over time. One week after the induction of uniformity (Stage 2), E returned to the class and again called groups into the experimental room in a predetermined random order. The same groups were used as those established for the uniformity induction. If one member of a three-person group was absent, that group was eliminated from this portion of the experiment, but if one member of a four-person group was absent, the other three members were called. Description of the subjects is given in Table 14.

Table 14

Summary of Experimental Conditions for

Uniformity over Time

| Condition | Mean Group Cohesiveness Index | Mean IQ | No. of Groups | Total No. of Ss |
|---|---|---|---|---|
| Hi I Hi Co | 4.67 | 121.16 | 16 | 51 |
| Hi I Lo Co | 2.92 | 123.07 | 9 | 30 |
| Lo I Hi Co | 4.66 | 101.71[a] | 17 | 56 |
| Lo I Lo Co | 2.67 | 96.39[b] | 9 | 29 |
| | | Total | 51 | 166 |

[a] based on an N of 55.

[b] based on an N of 28.

The first part of the procedure followed with each group involved a simple task introduced for the purpose of having the group members work together for a short time so that each child would be aware of the presence of the others before he responded to the test materials. The task was preceded by the following comments, made by E:

> I thought you'd like to know, first of all, that your suggestions for helping Tom and Jim (Theresa and Jane) were very good. I told some teachers and parents about them and they were impressed with your ideas and those of some of the other groups. We think these boys (girls) are going to get along all right from now on.

Then the task instructions were given:

> Today I'd like your help in getting some additions to my list of school and home activities. That is, I was hoping you could come up with some other things that children in your grade and of your age sometimes do at school and at home. Here are those lists of activities that you worked with last week. Why don't you try and see how many activities you can add to both of these lists in about five minutes. (E placed the two posters containing the School Activities and Home Activities lists on a stand in front of the Ss.) Think of new activities that are not already on the lists. Just call them out and I'll write them down.

E wrote down all suggestions except for duplications and nodded his head as he accepted an activity to be recorded. This continued for about 5 minutes after which E read aloud the suggested activities and gave a positive verbal reinforcement to the entire group. He said, "You have come up with some good suggestions. That was very good."

E then gave each group member either the school or home activities list (in counterbalanced order from group to group) with these instructions:

> Before you go back to your classroom, would each of you please look at that old list of school (home) activities again and write down how much you enjoy each one. Remember, put a 1 in front of the one you enjoy most, etc. Don't put your names on these lists.

E then collected the lists and passed out the second set (either School or Home Activities) with the same instructions. E collected each set of papers in such a way that he could identify the Ss.

Before the Ss returned to their class, E administered a sociometric test (Sociometric Test III) to each member of the group. Each member received a booklet containing the names of every other child in his group. The chairs of the Ss were moved apart for this test so that the Ss could not see one another's booklets. E's instructions were as follows:

> There is one final thing. You three (four) have met together with me twice now. It would be interesting for me to know how you feel about one another. I'm going to give each of you forms on which I want you to express your very honest feelings about each of the other 2 (3) boys (girls) in this group. The name of the person is printed on the top of the form. Put an X in the box in front of the statement which best describes how you honestly feel about him (her). Do the same for all the forms. Do not put your name anywhere on these papers. Any questions?

E was able to identify who rated whom because the rater's name was not included in his booklet.

## Hypotheses

It is predicted that greater uniformity of opinion will be induced, and will persist over a week's period, in high cohesive than in low cohesive groups. It is also predicted that induced uniformity will be greater for attitudes toward school activities than for attitudes toward home activities under both conditions of cohesiveness.

4

## Induction of Uniformity

Similarity among group members in their ranking of Home Activities and in their ranking of School Activities was determined by use of Kendall's W statistic, the Coefficient of Concordance (Siegel, 1956). This statistic provides an index of uniformity among a number of individuals in their responses to a number of items. Three W scores on Home Activities and three on School Activities were obtained for each group from member responses to the Pretests, to the Post Uniformity Induction tests, and to the Uniformity over Time tests, given one week after uniformity induction. Only the rankings of group members who were present on all three occasions were included in determination of group W scores on each test.

All Ss, except for those in one experimental class, had been pretested on both the Home and School Activities lists, enabling us to ascertain the degree of similarity among group members, on these tests, prior to their group experience and to the uniformity induction procedure. The Mean W scores on the Pretests for Hi Co and Lo Co groups, given separately for girls and boys, are presented in Tables 15 and 16, for Home and School Activities, respectively. High IQ and low IQ groups are considered together under the different cohesiveness conditions because no reliable difference was found between high IQ and low IQ groups in Pretest W scores (Mann-Whitney U tests, Siegel, 1956) either on Home or School Activities. (Separate comparisons between high and low IQ groups were

### Table 15

### Mean *W* Scores for High and Low Cohesive Groups on Home Activity Pretests and Post Uniformity Induction Tests

| Condition | No. of Groups | Pretest *W*s | | Posttest *W*s | | Changes in *W*: Post-Pre | | |
|---|---|---|---|---|---|---|---|---|
| | | *M* | *s* | *M* | *s* | *M* | *s* | *p*[a] |
| | | | | **Girls** | | | | |
| Hi Co | 18 | 52.11 | 24.2 | 68.94 | 20.2 | 16.83 | 18.4 | <.01 |
| Lo Co | 10 | 44.50 | 21.2 | 60.50 | 24.5 | 16.00 | 22.4 | ns |
| | | | | **Boys** | | | | |
| Hi Co | 16 | 51.56 | 17.4 | 63.75 | 19.4 | 12.19 | 29.6 | ns |
| Lo Co | 10 | 41.80 | 18.9 | 54.40 | 22.1 | 12.60 | 20.9 | ns |

[a] The probabilities are two-tailed; Wilcoxon matched-pairs signed-ranks test.

### Table 16

### Mean *W* Scores for High and Low Cohesive Groups on School Activity Pretests and Post Uniformity Induction Tests

| Condition | No. of Groups | Pretest *W*s | | Posttest *W*s | | Changes in *W*: Post-Pre | | |
|---|---|---|---|---|---|---|---|---|
| | | *M* | *s* | *M* | *s* | *M* | *s* | *p*[a] |
| | | | | **Girls** | | | | |
| Hi Co | 18 | 49.17 | 21.6 | 72.06 | 30.4 | 22.89 | 37.1 | <.02 |
| Lo Co | 10 | 54.70 | 29.3 | 73.60 | 23.8 | 18.90 | 28.3 | ns |
| | | | | **Boys** | | | | |
| Hi Co | 16 | 40.06 | 17.9 | 66.00 | 30.6 | 25.94 | 32.7 | <.02 |
| Lo Co | 10 | 42.00 | 19.6 | 48.60 | 31.1 | 6.60 | 39.0 | ns |

[a] The probabilities are two-tailed; Wilcoxon matched-pairs signed-ranks test.

made under Hi Co and Lo Co conditions.)

The W scores of Hi Co and Lo Co groups were compared on the Pretests by means of The Mann-Whitney U test. No reliable difference was found between cohesiveness conditions for either girls or boys on either Home or School Activities.

In each cohesiveness condition, the W score of each group on Home Activities was subtracted from its W score on School Activities and the differences were evaluated by means of the Wilcoxon matched-pairs signed-ranks test (Siegel, 1956). School-Home differences were found not to be reliable for Hi Co or Lo Co groups of either sex. Further, Hi Co groups did not differ significantly from Lo Co groups in the magnitude of these School Activities-Home Activities W differences (Mann-Whitney U test); this was true for both sexes.

Our measure of the success with which uniformity was induced among group members with respect to their ranking of Home Activities and School Activities is the difference between the Pretest W score of a group on each of these lists, and the W score of the same group on the corresponding Post Uniformity Induction test. Both Posttest W Means and Change in W Means (from Pretest to Posttest) are given (along with Pretest W Means) in Tables 15 and 16. A Mann-Whitney U test of the difference on this measure of change between high IQ and low IQ groups (separately considered under Hi Co and Lo Co conditions) revealed that they did not differ reliably on either Home or School Activities; the IQ distinctions were therefore ignored in subsequent analyses.

Considering Home Activities, first, it can be seen from Table 15 that groups in all the conditions increased, on the average, in uniformity (W scores) after the uniformity induction procedure. This increase is statistically significant for the Hi Co groups of girls, but not for the Lo Co girls or for either the Hi Co or Lo Co groups of boys (Wilcoxon matched-pairs signed-ranks test). When Hi Co groups were compared with Lo Co groups (Mann-Whitney U tests) the W score increases of the former were found not to differ reliably from the latter for either boys or girls, however. On the ranking of School Activities, also (Table 16), groups in all four of the experimental conditions generally increased in uniformity following its induction attempt by E. The Wilcoxon test revealed that the increase in W scores was reliable for Hi Co groups, both girls and boys, but not for Lo Co groups of either sex. A comparison of cohesiveness conditions with respect to the increase in W scores by means of the Mann-Whitney U test failed to indicate, however, that Hi Co and Lo Co groups differed significantly, for either sex.

Table 17 shows, for each experimental condition, the Mean difference between the increases in uniformity (from Pretest to Posttest) on School Activity rankings and Home Activity rankings. These differences are not reliable for either Hi Co or Lo Co groups of either sex (Wilcoxon test) and the differences for Hi Co groups do not differ significantly from the differences for Lo Co groups (U test), for either boys or girls.

## Table 17

## Differences between *W* Changes on School Activities and *W* Changes on Home Activities from Pretest to Post Uniformity Induction Test

| Condition | No. of Groups | Difference: Changes in *W* on School Acts. - Changes in *W* on Home Acts. | | |
|---|---|---|---|---|
| | | *M* | *s* | *p*[a] |
| | **Girls** | | | |
| Hi Co | 18 | 6.06 | 43.2 | ns |
| Lo Co | 10 | 2.90 | 27.4 | ns |
| | **Boys** | | | |
| Hi Co | 16 | 13.75 | 48.9 | ns |
| Lo Co | 10 | 6.00 | 28.5 | ns |

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[a] The probabilities are two-tailed; Wilcoxon matched-pairs signed-ranks test.

One week after the uniformity induction procedure, each group again worked on a task and members were again asked to rank the Home and School Activities lists (Uniformity over Time tests). From responses to these, *W* scores were obtained for each group. In Table 18 are given the Mean changes in *W* scores, for each Activities list, from the Posttests to the Uniformity over Time tests. It will be noted that the group Ns in Table 18 do not correspond with those in Tables 15, 16, and 17. The differences are due both to the inclusion of groups from that one class which did not receive the Pretests (and hence could not provide data for the earlier tables) and also to the elimination of groups left with only 2 members as a result of a member's absence on the day of the final group

## Table 18

### Changes in *W* Scores from Post Uniformity Induction Tests to Uniformity over Time Tests

| Condition | No. of Groups | Changes in Home Activities *W*s: Over time-Posttests | | | Changes in School Activities *W*s: Over time-Posttests | | | Differences between *W* changes on School Activities and *W* Changes on Home Activities | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *M* | *s* | *p*[a] | *M* | *s* | *p*[a] | *M* | *s* | *p*[a] |
| | | | | **Girls** | | | | | | |
| Hi Co | 19 | - 5.58 | 16.4 | ns | - 4.84 | 23.8 | ns | .74 | 27.4 | ns |
| Lo Co | 9 | -13.67 | 17.4 | .05 | - 4.00 | 10.9 | ns | 9.67 | 23.7 | ns |
| | | | | **Boys** | | | | | | |
| Hi Co | 14 | -13.43 | 18.9 | <.05 | -13.43 | 21.5 | <.05 | 0.00 | 28.8 | ns |
| Lo Co | 9 | - 1.89 | 22.7 | ns | - 8.44 | 14.0 | ns | 6.56 | 24.5 | ns |

[a] The probabilities are two-tailed; Wilcoxon matched-pairs signed-ranks test.

experience. In the Girls' Hi Co condition three groups were added while two were dropped; in the Girls' Lo Co condition, one group was added and two were dropped; in the Boys' Hi Co condition, two groups were dropped; and in the Boys' Lo Co condition, one group was added and two were eliminated.

It can be seen from Table 18 that, on the average, uniformity decreased over time in all conditions. The decrease was found to be statistically significant (Wilcoxon test) on Home Activities for Lo Co girls and Hi Co boys, and on School Activities for Hi Co boys, only. Using the Mann-Whitney U test, Hi Co groups were compared with Lo Co groups on their change in uniformity over time. For neither girls nor boys was the difference between cohesiveness conditions on this measure reliable.

Table 18 also presents the mean differences between W changes on School Activities and W changes on Home Activities from the Posttests to the Uniformity over Time tests. These differences are not reliable for any condition (Wilcoxon test) and Hi Co groups do not differ significantly on this measure from Lo Co groups (U test).

In Tables 15, 16, 17, and 18 variability in W scores (or differences between W scores) is shown by means of the statistic s, estimated standard deviation, used for small samples (McNemar, 1949). It should be noted that variability on all measures was extremely high under both cohesiveness conditions, and for both sexes.

### Sociometric Ratings

Following the final experience of group members with one another, after the Uniformity over Time tests, each S was asked to rate his fellow group members in a specially prepared booklet (Sociometric Test III). From these ratings a group cohesiveness index (GCI) was computed for each group, as prevously described, and these were then compared with earlier indices derived from the same Ss' ratings of one another on Sociometric Test II. (If an S was absent for Sociometric Test III his ratings of other group members on Sociometric II were omitted in calculating the GCI for his group based on ratings from the latter.) Table 19 shows the number of groups in each condition which increased, decreased, or stayed the same in GCI. All Lo Co groups increased, while Hi Co groups, by and large, also increased or remained at the same high level they were previously. One Lo Co group of boys is not represented in Table 19 because, through an error, they were not given Sociometric Test III.

## Discussion

Prior to the group experience and to the uniformity induction procedure, Hi Co and Lo Co groups did not differ in the degree of similarity which existed among their members on attitudes toward either school or home activities. These attitudes were tapped by means of the Pretests. This was what we had expected to be the case.

Following the uniformity induction procedure, we

### Table 19

### Changes in Group Cohesiveness Indices (GCI) from Sociometric Test II to Sociometric Test III, Given One Week after Uniformity Induction

| Condition | No. of Groups | No. of increases in GCI | No. of decreases in GCI | No. of no changes in GCI |
|---|---|---|---|---|
| | | Girls | | |
| Hi Co | 19 | 12 | 1 | 6 |
| Lo Co | 9 | 9 | 0 | 0 |
| | | Boys | | |
| Hi Co | 14 | 8 | 4 | 2 |
| Lo Co | 8 | 8 | 0 | 0 |

expected to find that uniformity had been more successfully induced among members of Hi Co than among members of Lo Co groups.

An analysis of our findings by means of the Wilcoxon test showed that Hi Co groups (both boys and girls) increased significantly in uniformity on school rankings following the induction procedure while Lo Co groups (of both sexes) did not, and that Hi Co groups of girls increased reliably in uniformity on home rankings. Thus, on the basis of these analyses, our prediction that greater uniformity would be induced in Hi Co than Lo Co groups can be said to be generally supported since on neither list of activities did Lo Co groups significantly increase in similarity of rankings by members. On the other hand, Hi Co groups did significantly increase in uniformity on the ranking measure for School Activities and Hi Co groups of girls, but not boys, increased significantly on this measure for Home Activities. When, however, Hi Co groups were directly compared with Lo Co groups of the same sex, by means of the U test, the analyses indicated no reliable differences between the cohesiveness conditions for either girls or boys, on either activities list.

Some groups in each condition scored in an extremely deviant manner from the others so that variability was sizeable. Because of this, and the discrepancy between our two analyses, we must conclude that our results are equivocal, but suggestive of the validity of our hypothesis.

With respect to changes in Uniformity over time, we found that uniformity decreased under all conditions over a one-week period following its induction. On Home Activities this decrease was reliable for Lo Co girls and Hi Co boys and on School Activities it was reliable again for Hi Co boys. Our prediction was that uniformity would be greater for Hi Co than for Lo Co groups, over time, or, in other words, that the uniformity of Lo Co groups would be expected to decline more over time than that of Hi Co groups. Thus, the significant decrease found for Lo Co girls (and not for Hi Co girls) supports our prediction, but the significant decrease for Hi Co boys (and not Lo Co boys) on both Home and School Activities goes against our prediction. We cannot, on theoretical grounds, understand why similarity within Hi Co boys' groups should have declined reliably over a one week's period while the decline within Hi Co girls' groups and Lo Co boys' groups was not reliable.

Again, when Hi Co and Lo Co groups were compared with the $\underline{U}$ test on magnitude of $\underline{W}$ decreases from the Posttest to the Uniformity over Time tests, no reliable differences were found for either sex on either activity list.

We had predicted that uniformity on the School Activities list would be greater, under both cohesiveness conditions, than uniformity on the Home Activities list since the former contains stimuli which are more similar to those in the real situations in which the children interact with one another. Our findings do not support this hypothesis. No reliable differences between $\underline{W}$ scores on School or Home Activities lists were obtained for Hi Co or Lo Co groups of either sex.

Our activities lists were constructed on the assumption that they differed in their degree of relevance to, or similarity with, the situations in which the children usually interacted. We had, however, no knowledge of whether or not the children we placed into the same groups did, or did not, also interact in their neighborhoods or in their homes. Thus, our findings may reflect an inadequate test of our hypothesis.

No prediction was made regarding changes in sociometric ratings among group members, but a general increase in group cohesiveness indices following group experience was expected and found.

## COHESIVENESS AS A FUNCTION OF REWARD

### Method

#### Subjects

Sixty-three fourth and fifth grade pupils (55 girls and 8 boys) served as Ss in this phase of the study. They were obtained from four fourth grade and four fifth grade classes different from the ones used in the previously described portions of this investigation but from the same four participating schools. The Ss took part in this phase of the project in same-sex groups of eight children per group.

#### Procedure

A sociometric test was given by the teacher to all the children in each of the participating classes. This test was identical to Sociometric Test I which was described in detail in an earlier section of this report. On the basis of information obtained from the Sociometric test, eight same-sex Ss were chosen from each class. The chosen group was to be given instruction in an interesting, novel subject (first aid), during which time the independent variable could be manipulated by rewarding some of the children with positive responses from the special teacher, and not rewarding other children.

Ss were chosen to participate with others in the eight-person group receiving special instruction if they had rated, and been rated by, these others relatively neutrally. The sex group containing more such individuals was used as the pool from which the Ss for special instruction were chosen. One group of boys and seven groups of girls were used.

On the day of the experiment, the experimenter made the following announcement to the entire class:

> We are interested in seeing if children your age can learn some first aid. To try this out, we have chosen a small group from this class for some first aid instruction for a short time today. We have more or less pulled these names out of a hat. Will the following boys (girls) come with me to the ____________ room and we'll have the first aid class there.

In the experimental room, the assistant pinned name tags on each S. Each name tag contained an S's first name as well as a number from 1 to 8. An S then sat in that numbered seat which corresponded with his own number. The seat number aided the observers in making notations about the Ss during the session.

By means of the S numbers, the special first aid teacher (a very personable female senior psychology student from the University) could identify those Ss who were to be rewarded and those who sere not to be rewarded (or were to be ignored). By prearrangement, the teacher, during the course of the one-half hour lesson,[6] rewarded only the even numbered Ss by recognizing, responding to, and maintaining eye contact with them. When the teacher asked simple questions, for example, she ignored any odd numbered S who raised his hand. If only odd numbered Ss raised their hands, the teacher waited a short period of time and then answered the question herself. In only a rare instance did an odd numbered S receive teacher recognition and when he did it was negative or critical in nature. The Ss in each group who were given even numbers (and reward) and those who were given odd numbers were determined or chosen by E prior to the special instruction procedure. Ss who tended to be more negative in their ratings of the other group members, on the Sociometric test, were chosen for the reward treatment (even numbers) while Ss who tended to be more positive in their ratings of the other group members were chosen for the no-reward treatment (odd numbers).

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[6] The actual time period ranged from 25 to 35 minutes.

Both E and his assistant observed each special instruction session and the interaction between the teacher and the Ss. Each observer independently recorded the number of times each S raised his hand or otherwise attempted to get the teacher's attention, the number of times he received a positive reinforcement, and the number of times he received a negative reinforcement or was ignored in his attempt to signal the teacher. Records were kept on a simple form developed and pretested for this purpose. A separate form sheet was used for each five minutes of the first aid lesson so that a single sheet would not get too crowded with check marks and so that any sequential effects could be examined if they appeared to be meaningful.

Following the first aid lesson Ss were given a test booklet containing dependent variable measures. These measures included a sociometric test, like the others previously used in this investigation, on which an S rated all the group members present for the lesson and also rated how much he liked the teacher. In addition, an S indicated how much he liked the lesson itself by rating it from 5 (I like it very much) to 1 (I dislike it very much) and how much he liked the subject (first aid), generally, by rating it from 3 to 1. Finally, Ss were asked to list the names of any seven children in their class with whom they would like to be in a future special class, like the first aid class they had just completed.

## Hypotheses

It is predicted that rewarded children will like the other group members, the teacher, and the lesson studied more than will non-rewarded children. It is further predicted that rewarded children will choose more children from their special group to participate in a future group than will non-rewarded children.

## Results

Two observers independently recorded particular types of interaction between the special teacher and the children in each of the eight groups selected for the first aid lesson. These observations were made to provide a check on the experimental manipulation of Reward (R) and Non-Reward (N-R) conditions. The average numbers of positive reinforcements and non-reinforcements which the teacher administered to the even numbered (Reward condition) and to the odd numbered (Non-Reward condition) *Ss*, according to the observers, are shown in Table 20.

Instances of positive reinforcement were defined by:

> *S* raises hand (or otherwise signals teacher) and is called on; or *S* is called on without raising hand.

Whenever an *S* was called on, his response was evaluated positively. Instances of non-reinforcement were defined as follows:

> *S* raises hand (or otherwise signals teacher) and is not called on; or *S*'s behavior is negatively evaluated by teacher.

(Minimal use was made by the teacher of the latter technique.) The correlation (Pearson's coefficient, *r*, McNemar, 1949) between the two observers in frequencies of positive reinforcement which they recorded for each *S* is .96; this correlation is based on an N of 32, i.e., even numbered *Ss* only, since only three odd numbered *Ss* were observed to receive reward. The correlation between the two observers in frequencies of non-reinforcement recorded for each *S* is .95 (N = 63 including both even and odd numbered *Ss*). The Means given in Table 20 were computed from the average frequency, per *S*, for the two observers.

Eight groups of children were used; in each there were four even numbered (R) *Ss* and four odd numbered (N-R) *Ss*. In one group, however, one *S* assigned to the N-R condition was absent on the day of the experiment, and so, too, were her two possible replacements. This group was therefore run with seven *Ss*, making the total N for the N-R condition 31

Table 20

Mean Number of Positive and Non-reinforcements Received by Even and Odd Numbered *Ss* from the Special Teacher

| Subjects | N | Positive Reinforcements<br>M | Non-reinforcements<br>M |
|---|---|---|---|
| Even numbered, Rewarded | 32 | 11.11 | 4.56 |
| | | $p^a < .001$ | $p^a < .001$ |
| Odd numbered, Non-Rewarded | 31 | .10 | 14.15 |

[a]Mann-Whitney *U* test; probabilities are two-tailed.

and not 32 as is the case for the R condition.

Mann-Whitney *U* tests were used to compare the even with the odd numbered *Ss* on the number of positive reinforcements and the number of non-reinforcements received, according to the observers. The two conditions differed significantly with respect to each of the reinforcement treatments. This indicated that the independent variable had been successfully manipulated and we could proceed with further analyses confident that the even numbered *Ss* had not.

The R and N-R *Ss* were next compared on the ratings they had made of their fellow group members on The Sociometric Test (Pretest) administered prior to the group experience or to any expectation of such an experience. These data are shown in Table 21. For each *S*, the Mean of his ratings of the other *Ss* who were subsequently put into his group was computed, as well as the Mean of his ratings of the R and N-R members of his group.

It can be seen, first of all, that the *Ss* chosen for the N-R condition rated the others in their group reliably higher than did the *Ss* chosen for the R condition (Chi Square) and that this was also the case for ratings of other N-R *Ss*, and for ratings of R *Ss*, separately considered. In each case *Ss* in the N-R condition *made* significantly higher ratings than did *Ss* in the R condition. This was on the Pretest, prior to any experimental manipulation of conditions. It is also of interest to note that R *Ss*, on the Pretest, *received* higher ratings than N-R *Ss*, both when these ratings were made by other R *Ss* and when the ratings were made by N-R *Ss*. In the latter case the difference is clearly statistically reliable while in the former it is very close to the acceptable level (Wilcoxon matched-pairs signed-ranks test).

Since on the Pretest R, and N-R *Ss* differed reliably with respect to the ratings they made of other *Ss*, our hypothesis regarding the effects of reward manipulation on the degree of consequent liking among group members had to be tested, not by examining Posttest ratings alone, but by examining Pretest to Posttest changes. (The Posttest, in the form of a special Sociometric booklet, was administered by the E immediately after the first aid lesson.) These changes are shown in Table 22. Since, further, R *Ss* received higher ratings on the Pretest than did N-R *Ss*, Table 22 presents the Pretest to Posttest changes in ratings of R and N-R *Ss* separately. Where the N for R *Ss* is less than 32 and where the N for NR *Ss* is less than 31, it is because an S failed to make the necessary rating.

## Table 21

Mean Ratings Made by Ss on the Sociometric Pretest

| Subjects | N | Mean of Mean Pretest Ratings of all other Ss in group | of R Ss | of N-R Ss | Difference between Mean Ratings of R Ss and Mean Ratings of N-$\bar{R}$ Ss |  |
|---|---|---|---|---|---|---|
|  |  |  |  |  | M | $p^a$ |
| Rewarded | 32 | 3.15 | 3.38 | 2.98 | .40 | .07 |
| Non-Rewarded | 31 | 3.92 | 4.03 | 3.77 | .26 | .02 |
|  |  | $X^2 = 29.49$ | $X^2 = 24.14$ | $X^2 = 22.36$ |  |  |
|  |  | $df = 1$ | $df = 1$ | $df = 1$ |  |  |
|  |  | $p^b < .001$ | $p^b < .001$ | $p^b < .001$ |  |  |

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[a] Wilcoxon matched-pairs signed-ranks test for large samples; probabilities are two-tailed.

[b] Probabilities are two-tailed.

## Table 22

### Changes from Pretest to Posttest in Mean Ratings of Other Group Members

| Subjects | Changes in Mean Ratings of R $\underline{Ss}$ | | | Changes in Mean Ratings of N-R $\underline{Ss}$ | | | Difference between Changes in Mean Ratings of R Ss and Changes in Mean Ratings of N-R $\underline{Ss}$ | | |
|---|---|---|---|---|---|---|---|---|---|
| | N | $\underline{M}$ | $\underline{p}^a$ | N | $\underline{M}$ | $\underline{p}^a$ | N | $\underline{M}$ | $\underline{p}^a$ |
| Rewarded | 32 | .80 | <.001 | 31 | .88 | <.001 | 31 | -.08 | ns |
| Non-Rewarded | 31 | .31 | <.01 | 30 | .68 | <.01 | 30 | -.37 | .01 |
| | $\underline{X}^2 = 2.67$<br>$\underline{df} = 1$<br>$\underline{p}^b$ <.20>.10 | | | $\underline{X}^2 = 4.73$<br>$\underline{df} = 1$<br>$\underline{p}^b$ <.05 | | | | | |

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[a] Wilcoxon matched-pairs signed-ranks test; probabilities are two-tailed.

[b] Probabilities are two-tailed.

It can be seen that in all cases, i.e., ratings of R and N-R Ss by R and N-R Ss, the average Pretest to Posttest changes were positive ones, or increases, and in each case this increase is a statistically reliable one (Wilcoxon test). R Ss increased their ratings of other R Ss and of N-R Ss more than did N-R Ss. With respect to ratings of other R Ss, the difference between R and N-R Ss does not reach statistical significance (Chi Square) while the difference is reliable for the average ratings of N-R Ss.

To see whether R Ss continued to be more attractive than N-R Ss, i.e., to receive higher ratings, we compared the difference between the Pretest to Posttest changes in the ratings made of R Ss with the changes in the ratings made of N-R Ss (Wilcoxon tests). For ratings made by other R Ss, this difference was not significant, whereas for ratings made by N-R Ss this difference was significant. R Ss increased their ratings of both NR and R Ss by an equal amount, whereas NR Ss increased their ratings of other N-R Ss reliably more than they increased their ratings of R Ss.

Table 23 presents the Mean number of in-group choices made by Ss in the two reward conditions when asked to choose members (from their larger class) for another special instruction group. Of the 32 R Ss, one did not respond while six made 8 instead of 7 choices; and of the 31 N-R Ss, five made 8 instead of 7 choices. These Ss are not represented in the table. As is apparent from the Means, there is no reliable difference between the R and N-R Ss on this measure. According to the observers, Ss tended to copy names from the Posttest Sociometric booklet in their possession at the time they responded to this additional question. The Posttest Sociometric booklet contained the names of other group members. The Ss appeared to use these names in order to avoid spelling errors in writing the names of other classmates.

Table 23

Number of In-group Choices Made by Ss for Composition of New Group

| Subjects | N | Mean No. of In-group Choices out of 7 |
|---|---|---|
| Rewarded | 25 | 3.28 |
| Non-Rewarded | 26 | 3.96 |

R and N-R Ss were also found not to differ in their ratings of the special teacher, the lesson, and the general subject of first aid. The Mean ratings are given in Table 24. Where the N for R Ss is less than 32 and where the N for N-R Ss is less than 31, the missing Ss did not make the necessary ratings.

Table 24

Average Ratings of Teacher, Lesson, and General Subject

| | Ratings of | | | | | |
|---|---|---|---|---|---|---|
| Subjects | Teacher | | Lesson | | General Subject | |
| | N | M | N | M | N | M |
| Rewarded | 32 | 4.81 | 31 | 4.87 | 31 | 2.97 |
| Non-Rewarded | 30 | 4.83 | 31 | 4.97 | 29 | 3.00 |

## Discussion

We predicted that children rewarded by their teacher in a classroom situation would like other children in their group more than would children who were not rewarded. Pretest results indicated that those children who were assigned to the R condition differed, initially, from those assigned to the N-R condition in two ways: they *gave* lower ratings to the other *Ss* assigned to their group than did the N-R *Ss* while they *received* higher ratings than did N-R *Ss*. It is the first mentioned difference between the R and N-R *Ss* that is of greater concern because it complicates interpretation of our findings regarding changes in ratings from the Pretest to a similar (but not identical) sociometric Posttest.

We found, first of all, that *Ss* in both the R and N-R conditions reliably increased their ratings of the other *Ss* in their groups, i.e., that the average ratings which *Ss* gave to others became significantly more favorable under both conditions. In addition, however, the increase in ratings made by R *Ss*, of both other R *Ss* and of N-R *Ss*, was greater than the increase in ratings made by N-R *Ss*. The greater increase in the ratings of N-R *Ss* by R as compared with N-R *Ss* is a statistically significant one; the difference between R *Ss* and N-R *Ss* in their ratings of R *Ss* is short of statistical reliability. These findings support our hypothesis. Rewarded children changed more than did non-rewarded children in the direction of liking others in their group, after differential treatment by the special teacher in the presence of the other children in their group. (Observers' records support the fact that Ss in the R and N-R conditions were, indeed, treated differently by the special teacher.) Unequivocal acceptance of our results at face value, however, is prevented by the fact that the N-R Ss, who made higher ratings of other Ss initially (Mean average Pretest rating = 3.92) than did the R Ss (Mean average Pretest rating = 3.15), perhaps could not increase their ratings as much as R Ss on the Posttest because ratings were limited to a maximum score of 5. What the effect this "ceiling" had on our findings we do not know.

It is of interest to note that Ss assigned to the R condition were more liked by the other group members initially (according to Pretest ratings) than were Ss assigned to the N-R condition. When, however, we look at the Pretest to Posttest rating changes, we find that R Ss increased in their favorability toward both N-R and other R Ss equally, but N-R Ss increased significantly more in their favorability toward other N-R Ss, i.e., toward Ss who had received similarly unfair or poor treatment from the special teacher. These findings on differential ratings of N-R and R Ss were not predicted and were not anticipated. They are quite consistent, however, with other findings by other researchers cited in an earlier section of this report. R Ss increased their ratings of others more than did N-R Ss, as we predicted on the basis of our learning theory formulation; and the increased favorability was the same for other R as for N-R Ss. N-R Ss, however, who generally increased in their favorability toward others less than did

R *S*s, increased more toward other N-R *S*s than toward R *S*s. This latter result is congruent with previous findings of increased interpersonal attraction among individuals who were frustrated or threatened by the same external source. The role played by the rating "ceiling" is here, again, unknown, preventing definitive conclusions.

Our measure of interpersonal attraction in the form of asking the *S*s to choose seven classmates for another special instruction group yielded no difference between R and N-R *S*s, but observations of the children's behavior while they responded to this question, described previously, call into question the validity of this measure.

With respect to ratings of the teacher, the lesson, and the subject of first aid, which the *S*s made subsequent to the lesson, both R and N-R *S*s gave equally high ratings to the teacher and to the lesson, and equally neutral ratings to the subject. These data are in opposition to our prediction that the rewarded children would respond more positively than those who were not rewarded. We can suggest, however, that a type of "Hawthorne effect" may have operated here, i.e., the *S*s, both R and N-R, were *chosen* from their larger class for special treatment, thus perhaps causing them to be favorably disposed toward various aspects of this treatment, as for example, the teacher and the lesson. In addition, the teacher was a pleasant looking and generally pleasant acting person. We suspect, nevertheless, that if the R and N-R *S*s had continued to receive differential treatment from the teacher for a period longer th[illegible] minutes, differential ratings of her and the lesson would have resulted. Additional research along this line should be worthwhile.

## CONCLUSIONS

Here we shall broadly summarize the major findings of the investigation and indicate directions for further research that the results seem to suggest.

### Learning

Among elementary school pupils with a relatively high IQ (M = 120.79), especially girls, we found that learning (of foreign words) was facilitated if they worked in small, high cohesive groups, i.e., with other children whom they liked. This was generally true for initial learning of new words, for retention over time, for relearning of the words at a later time, and for learning of another group of foreign words by a different procedure. For lower IQ children (M = 98.21) the reverse effect was generally observed. Among these pupils, those who studied in low cohesive groups tended to do slightly better than those who worked in high cohesive groups. This held true for initial learning, retention, relearning, and new learning, although the results are not as reliable here as they are in the case of high IQ subjects.

Further research on this question should investigate the effects of different types of tasks and different levels of task difficulty on the cohesiveness-learning relationship. There is the suggestion in our results that high cohesiveness will facilitate the learning process where the task is appropriate to the level of functioning of the individual learners or is not complex, i.e., where competing responses are few. We suggest that on complex tasks, where many competing responses are possible, the motivational aspects of high group cohesiveness will tend to strengthen the competing responses as well as the more appropriate responses, thus having a negative effect on learning.

## Task Persistence

Our results show that group cohesiveness, the degree of liking between partners, made no difference for persistence by fourth and fifth grade children in the face of a difficult task (reproduction of block-designs). Post-hoc considerations, however, have led us to believe that our test of task persistence was not an adequate one; we believe that we made it too easy for a group (pair of children) to give up when they faced a difficult design. The cohesiveness-task persistence relationship should be reexamined using a pre-validated measure of persistence as well as different types of tasks of different levels of difficulty.

## Uniformity

Elementary school pupils in small, high cohesive groups significantly increased in their opinion uniformity regarding school activities following an experimental procedure designed to induce uniformity, while uniformity among pupils in low cohesive groups did not increase reliably. Also, girls in high cohesive groups, but not in low cohesive groups, increased their uniformity with respect to opinions regarding home activities. These findings indicate that group cohesiveness, the degree of liking among children, has a bearing on whether or not the children will adopt and conform to a common standard.

We had predicted that greater uniformity would be induced within groups on school activities opinions than on those regarding home activities, but this hypothesis was not supported. We cannot be sure, however, that our two lists of activities validly represented genuinely disparate points on a continuum of similarity with stimuli which we presume were present when the children developed their liking (or not liking) for one another.

There was a wide range in uniformity changes among groups under both high and low cohesiveness conditions. In other words, we found some extremely deviant reactions to the uniformity induction procedure. Investigation of factors which lead to diverse reactions among groups to uniformity pressures should prove valuable.

## Cohesiveness and Reward

In an experimental classroom setting in a real life school situation, it was found that following a first aid lesson by a special teacher, all children (in 8 different groups of 8 Ss each) increased their liking for one another, on the average, to some reliable extent. However, children who were rewarded by positive recognition from the special teacher increased their liking of the other children in their groups more than did children who were not rewarded. In other words, the teacher's differential behavior was instrumental in producing a greater increase in mutual positive attitudes among children rewarded in one another's presence than among those not rewarded. Rewarded subjects increased their liking for other rewarded children no more nor less than they increased their liking for the non-rewarded children, but the latter increased their liking for one another reliably more than they did for the rewarded children. This finding supports other data which have found that common threat or frustration from an outside source positively influences interpersonal attraction.

Our prediction regarding the influence of reward on liking was confirmed by our findings but since S̲s were limited in their ratings of one another by a maximum score of 5, and since non-rewarded children rated one another higher than rewarded children initially, there is need for further research under conditions where such a ceiling problem is eliminated from the rating scales.

The teacher's reward or non-reward of the children made no difference in their liking for her, the lesson presentation, or the subject matter studied (first aid). We believe, however, that the subjects felt very special because each was chosen with seven others from his or her class for special instruction and thus the situation was, in general, a very attractive one.

## Overview

With regard to our first objective, to demonstrate a positive relationship between the cohesiveness of a group and the degree of motivation exhibited by its members in the performance of tasks within the group, we can conclude the following: our data suggest that this is the case for learning by high IQ children and the reverse for learning by low IQ children; but our data did not support our expectation for task persistence.

Our second objective was to test the relationship between cohesiveness and the degree to which group members will manifest uniformity. We obtained data supporting our major prediction that the greater the cohesiveness, the more will individuals within the group adhere to common standards.

Finally, we demonstrated also, but not unequivocally, that, in a simulated classroom setting, positive attitudes of pupils toward one another are positively related to their receipt of reward within that setting and within one another's presence.

We believe that we have shown that the degree of liking among elementary school children (the degree of group cohesiveness) has a significant influence on aspects of pupil behavior which are of primary concern to educators. Our findings have also raised additional questions for future research.

We hoped that by investigating relationships between a group variable like cohesiveness and individual behavior in the context of public schools we could contribute both to a general understanding of group processes and to the achievement of teaching goals by the classroom teacher. We believe we have succeeded in this to some small degree. In addition, our theoretical framework, that of reinforcement learning theory, has proved a useful source of hypotheses regarding group behavior, hypotheses generally supported by our research findings.

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